American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—January, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JANUARY 4TH, 1888.—The Society met at 20 o'clock, President William E. Worthen in the Chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Channing Moore Bolton, Washington, D. C.; De Clermont Dunlap, Chicago, Ill.; Henry Holbrook Gladding (elected Junior July 1st, 1885), New Haven, Conn.; Arthur Haviland (elected Junior January 4th, 1882), San Antonio, Tex.; Camille Stanislaus d'Invilliers, Philipsburg, Pa.; Charles Hees Ledlie, St. Louis, Mo.; Henry Benjamin Patten, Cheyenne, Wyo.; Frederick John Henry Rickon, Little Rock, Ark.; George Francis Wright, Santa Barbara, Cal.; John Muirhead Stewart (elected Junior March 2d, 1887), Dobbs Ferry, N. Y. As Juniors: Julius Le Roy Adams, Brooklyn, N. Y.; Francis Henry Bainbridge, Wilmington, Del.; Eugene Carroll, Covington, Ky.; Russell Wadsworth Hildreth, Athens, Pa.; Alexander Edward Kastl, Chicago, Ill.; William Anthony Lydon, Chicago, Ill.; Alexander Potter, Kansas City, Mo.

A paper by G. Lindenthal, M. Am. Soc. C. E., on the North River Bridge Problem, with a Discussion on Long Span Bridges, was read by the author, and discussed.

THE ANNUAL MEETING OF THE SOCIETY.

JANUARY 18TH AND 19TH, 1888.

JANUARY 18TH.—The meeting was called to order at 10.30 o'clock, President William E. Worthen in the chair; John Bogart, Secretary.

It was, on motion, ordered that the ballot for officers of the Society should be declared closed at noon. Messrs. Charles W. Hunt, Arthur Haviland and Edgar B. Gosling were appointed Tellers to canvass this ballot.

The Annual Report of the Board of Direction* was read by the Secretary, and, on motion, accepted.

The Annual Report of the Treasurer* was read by the Treasurer, and, on motion, accepted.

The Report of the Finance Committee* was read, and, on motion, accepted.

The following statement of suggestions made by members of the Society as to the place for the next Convention was read:

Milwaukee was suggested by 155; White Sulphur Springs by 6; San Francisco by 5; Old Point Comfort by 5; Atlanta, Ga., by 5; Pittsburgh, Pa., by 4; Chicago, Ill., by 4; Cleveland, O., by 4; Lake George, St. Paul, Minneapolis, Anniston, Ala., Omaha, Newport, R. I., and New York, each by 2; Atlantic City, Boston, Chatauqua Lake, Cresson, Deer Park, Duluth, Hartford, Kansas City, Lookout Mountain, Louisville, Mackinaw, Marquette, Montreal, Narragansett Pier, Niagara, Philadelphia, Providence, St. John, N. B., Saratoga, Hotel at Stow, Vt., Syracuse, Washington, D. C., and White Mountains, each by 1; that we accept no invitation from any place, but go on our own responsibility, by 2.

A communication was also presented, signed by all the members resident at Milwaukee, Wis., and by the Mayor of that City, requesting the Society to favorably consider the propriety of holding the Convention at Milwaukee.

On motion, the City of Milwaukee, Wisconsin, was designated as the location for the next Convention. The determination of the time for the Convention was referred to the Board of Direction with power.

The discussion of the proposed amendments to the Constitution was made the special order for noon.

The report of the special standing Committee on Uniform Standard Time* was presented and read, and, on motion, accepted, and the Committee continued.

The Special Standing Committee to consider a plan for creating a Library for joint use presented the following report, which was read:

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* Printed separately, following these minutes.

To the American Society of Civil Engineers:

I beg to report on behalf of the "Committee to consider a plan for creating a Library for joint use," that no satisfactory progress has been made in the matter, and that while my conviction remains as heretofore that such a joint library should be created, I am unable to give sufficient encouragement in the matter to warrant me in asking for a continuance of the Committee.

Respectfully submitted on behalf of the Committee.

WILLIAM P. SHINN,
Chairman.

On motion the report was accepted and the Committee discharged.

The report of the Committee to consider the proper relation to each other of the Sections of Railway Wheels and Rails being called for,

Mr. A. M. WELLINGTON, member of the Committee, said:

Mr. President, Mr. H. Stanley Goodwin, the Chairman of the Committee, has requested me to report that at the time of the last Convention at the Kaaterskill, the Committee had under consideration a very large mass of matter. It was arranged that I should put that matter into shape and draft a rough form of report. At that time we expected to have finished our duties and to present a report at this meeting; but since that time I have lost two months by sickness, and in addition have had a large increase of work of another nature to occupy my attention. I expected to have been able to straighten out the various documents, which have still further increased since the time of the Convention, but I think that I can promise this report for the next Convention.

We ask that the Committee be continued, and in place of Mr. Morison, who has gone abroad, that authority be given to fill his place on the Committee.

On motion, the Committee was continued and the President and Board of Direction were authorized to fill the vacancy occasioned by the absence of Mr. Morison in Europe.

The subject of the existing ambiguity of engineering titles was presented by letter by Messrs. JOHN A. FULTON, M. Am. Soc. C. E., and C. D. PURDON, M. Am. Soc. C. E.

Mr. JOHN A. FULTON (by letter): An old engineer, not a member of the Society, has requested me to call the attention of members to two very ambiguous terms always encountered in railroad construction.

They are "Division Engineer" and "Resident Engineer." If the matter could be discussed at the Society meeting and an agreement arrived at as to which, in the Society's opinion, should be regarded as the higher of the two; and then a circular letter addressed to the various General Managers and Chief Engineers throughout the country, with a request that they adopt its suggestion, some uniformity in the meaning of each of these terms could be arrived at, and annoying mistakes avoided. I trust that some one will take enough interest in this matter to bring it before the Society.

Mr. C. D. PURDON (by letter): Would it be proper to ask the Society to define the use of the names Assistant, Division and Resident Engineers? On some roads in the Southwest the Resident Engineer comes next below the Chief, then Assistant, then Division; on others the Resi-

dent Engineer is the lowest grade, so that it is impossible, without personal knowledge, to know the exact status of a man who applies for a position and says he has filled one of these positions.

Even if it would not be correct for the Society to make a rule in the matter, their recommendation would do a great deal in making the names of position uniform.

The subject was discussed by Messrs. D. J. Whittemore, A. M. Wellington, John Bogart, J. J. R. Croes, E. L. Corthell and A. Fteley.

On motion it was resolved, That a committee be appointed by the President to formulate recommendations with reference to the Grades and Titles of Engineers on Public Works and to report at a future date.

Subsequently the President announced the appointment of the following members of the Society as such committee: Messrs. D. J. WHITTEMORE, ALBERT A. ROBINSON and JAMES L. RANDOLPH.

The hour of noon having arrived, the ballot was declared closed.

The consideration of the proposed Amendments to the Constitution, having been made the special order for this hour, was then entered upon.

The following amendments as regularly submitted and as previously sent to all members, were then read:

A. 1. Amend Article XVI of the Constitution by substituting for the present Article the following:

CONSTITUTION.—*Article XVI.*

The active members of the Society shall be divided into three classes, to be styled respectively Members, Associate Members and Associates, and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Associate Members shall have all the rights and privileges of Members excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and privileges of Members, excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

Members of the Class previously styled Juniors, shall after March 7th, 1888, be classed as Associate Members.

2. Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age, who has been in active practice as such for at least ten years, or has graduated at a School of Engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident, or Superintending Engineer for at least two

years, not as a skillful workman merely, but as one qualified to design as well as to direct engineering works.

An Associate Member shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a School of Engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who is a manager of a railroad, canal or other public work; a geologist, chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit; qualifying him to co-operate with engineers in the advancement of professional knowledge; but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an Engineer, and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent Engineer for not less than two years. A Student shall not remain in that grade for more than seven years; if not elected to a higher grade his connection with the Society shall terminate at the end of seven years, or upon his attaining the age of twenty-seven years.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Nominations and proposals for admission to the Society, except to the grade of Student, shall be endorsed by at least five members, who certify that they personally know the nominee or candidate, and that he is worthy of acceptance. The proposal for Member, Associate Member, or Associate, shall contain a statement, over the candidate's signature, of his age, residence, the nature and term of his professional service, and that he will conform to the requirements of membership, if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept, if elected. Nominations for Students shall be made out as for other grades, but the endorsement may be signed by a Member, Associate Member, or Associate, and but one such signature will be required. Such nominations shall follow the usual course of procedure for other grades except submission to a letter-ballot; the Board of Direction shall elect or reject the applicant.

A proposal for transfer from one class to a higher shall be made by at least five members, and shall state the age of the candidate, and the nature and term of his professional service since his admission to the Society. Such statement shall show a degree of qualification sufficient to render the proposed eligible to election in the class to which transfer is asked. Upon the approval of the Board of Direction, the candidate shall be balloted for, as provided in the election of members; and when the transfer is made, he shall be required to pay as an additional entrance fee the amount of the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XIX.

In elections for membership of either class, Members shall vote by letter, or by ballot in the usual way, and the result shall be announced at the next regular meeting held after twenty-five days have elapsed from the time of mailing the notification. Five or more ballots cast in the negative shall exclude. Members notified but not responding shall be classed as having voted in the affirmative. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

In the election of students by the Board of Direction, one negative vote shall exclude the applicant.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more Members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the Member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall in any event be the only public announcement of the matter. A Student may be summarily expelled by a majority vote of the Board of Direction at any time.

B. Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" at the end of the first clause of the Article the following:

"But the proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C. Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, and requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open ballot,

and five or more ballots cast in the negative shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall not be less than 25 days after the Secretary has issued the notice above mentioned."

D. Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX.

Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

The President stated that under the provisions of the Constitution these proposed amendments were now in order for discussion, and that they could be amended in any manner pertinent to the original amendments by a majority vote at this meeting.

The amendments were then discussed.

Mr. J. J. R. Croes.—As any material changes would necessarily interfere with the main idea of these proposed amendments and prevent the Society, as a body, voting upon the main question at issue, certain members who had proposed to offer amendments to these have decided to withdraw any proposition for changes, and ask simply that the amendments, as proposed by the committee, go out for letter-ballot to the Society as they stand, with such discussion as may be had at this meeting, so that all members may fully understand the subjects at issue.

The ground of opposition to the proposed changes in the Constitution is stated succinctly in the circular which was sent out to the members recently, and is as follows: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association."

It was also suggested to enlarge the definition of the term Civil Engineer, because it really includes all branches of engineering work. Also it was suggested that the full period of study at a preparatory school should not be considered as equivalent to the same period of actual practice in the profession.

The gentlemen present can, of course, express their views on the subject very fully. There are some members who are not able to be present, whose views have been sent, and should be read before the meeting and go out as part of the discussion. I will therefore read these communications.

Mr. M. J. Butler (by letter).—I desire to put myself on record as a

supporter of those who are seeking to establish a student grade of membership in the Society. I am a member of two engineering societies wherein student grades exist, and I have yet to learn of any objections to them. The great success of the Institution of Civil Engineers of England is largely due to its student grade. The smaller success of the Canadian Society of Civil Engineers is due, not to the students, but to the youthfulness of the society itself.

I take exception, however, to the low grade of qualification called for in a student member.

A student should be a young man not less than 18 years of age nor more than 25; he should have gone through three years of the technical school or have had at least two years' practical experience and study under a practicing civil engineer, and his election should depend on the statement furnished as to his preliminary educational acquirements. A student should be nominated by a Member or Associate Member. An Associate who is not a civil engineer should not have the nominating of any member of this Society.

Mr. ROBERT E. MCMATH (by letter).—I do not think that the creation of the proposed student grade would be a departure from the declared policy of the Society. It is no more than pursuing one step further what was begun when the class of Juniors was established. To the proposition of the committee which drafted the amendments, that there is not room for a student grade below the present Junior, there seems to be no dissent. To the other proposition, that room be made by advancing the standard of qualification for all grades, there is, so far as I know, no serious opposition. But it seems there are those who are not willing that the room so made shall be occupied.

A circular issued by a number of influential and honored members of the Society says: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association." This is a definition of the objects of the Society that is certainly not consistent with Article II of the Constitution, and, as I understand it, not consistent with the claim made for the Society of being national, or rather continental, in its scope. If the statement quoted is intended to hinge upon the word primary, then it is not pertinent to the subject before us, for no one proposes that the character or style of papers and discussions be changed, unless for the better. The clause in Article II of the Constitution, placing "the professional improvement of its members" as first in the objects of the Society, is meaningless unless a leading object is education. The only question is

the age and relative standing of the classes. The proposition pending defines the age and standing of three classes, which might be styled Senior, Intermediate and Preparatory. I assume that we all wish to be learners to the end of our lives. Again, Article II makes "the advancement of engineering in its several branches" the third object. This is meaningless if the work of the Society does not look to the future, not for days only, but years. How can it better look to and care for the future of the profession than by affording facilities and opportunities to those who will be the profession in coming years? To create the proposed grade is to go forward; to reject the proposition is to go backward, for to stand still in an active age is impossible.

The idea of an association of skilled and experienced engineers exchanging ideas and experiences for mutual improvement is much narrower than I am willing to believe is entertained by any considerable number of members; but it is in the line of the, to me, objectionable policy which now withholds our Transactions from sale, and practically forbids republication of papers.

Members will please observe that, practically, the only privilege the student will use is that of owning the Transactions; they can read them now in libraries. It is not possible that any considerable number can avail themselves of the right to use the library and rooms and to attend meetings. Nor may we expect that many papers by student authors will pass beyond the hands of the Library Committee under Section 16 of By-Laws. Hence the inability of novices to understand advanced ideas will not be offensively shown in the presence of their elders. Were it otherwise, I am inclined to think that it would often be a good thing for the elder to see how quickly an idea will be grasped by the novice, and how promptly he will detect the fallacies even of experienced and skillful engineers.

Referring to the last clause of the quotation from the circular, I request attention to the fact that the proposed amendments nowhere speak of students as a grade of membership. Membership begins with the grade of Associate. Students are received without much formality, and may be dismissed with less.

The amendments may certainly be divided into two propositions. First, increased experience and age in all classes; second, the creation of the preparatory grade. To such a division I make no objection, provided that both are submitted to the Society for letter ballot.

Concerning the proposed substitute form of Article XVII, I would remark that the Committee considered the advisability of enumerating the branches of engineering, and decided not to do so, for the very good reason that the branches are not themselves defined. As an illustration, let the "city" engineer find in the proposed substitute the designation under which he would come if his specialty has been street grades and pavements.

To the proposed change from seven years to eight in qualification of graduate Members, and from two to three of graduate Associate Members, I have no objection; rather the contrary.

Also the striking out of the occupations of Associates is a change for the better. In fact, there are many clauses of the existing Constitution which could be improved in style. But your Committee adhered to its instructions, and proposed only necessary changes, rendered so by the proposed new grade.

Mr. CARL GAYLER (by letter).—The Commitee appointed to consider the advisability of adding a student's grade to the Society state in their report that the only objection raised against the new grade is the danger of lowering the standard of the Society; but it seems to me that there are two other objections important enough to be taken into consideration, namely, the influence of a membership in the American Society of Civil Engineers, even in a lower grade, on the young student, and the distinction in favor of the student, implied in this membership, between him and a young man who is not lucky enough to enjoy a regular professional education.

A student may, generally speaking, be designated as a young man whose parents had the means and good sense to send him to a higher school; he has been more fortunate in that respect than other boys of his age, presumably equally gifted and ambitious as himself. This is all; there is no merit on his part, and it is adding insult to injury to tell the young man who has not had these advantages, "that there is little excuse for any young man who would enter the profession without the advantage of a technical education."

We also know, and we know it partly from experience with ourselves, that the trouble with the student and graduate is his exalted opinion in regard to his own usefulness in life. It is true, actual life will, sooner or later, rub off some of this very pleasant opinion; but it is certainly not desirable to foster and increase the same, as would, in my opinion, be done through the establishment of this new grade.

Taking the case of two young men, one of them either at some high technical school, or under the tuition of some competent engineer, the other without means, working perhaps for his daily subsistence in some shop, with no other tools for his success but such as his own energy and perseverance will furnish him; we invite the former, under the amended Constitution, to a grade in our society, whilst the other sees, in the race for success, a new distinction made between himself and his more favored competitor.

We have to keep in mind that the best men, as a rule, are not those who had the greatest advantages for learning in their youth; and that it is generally the hard battle of life which forms the successful man. By smoothing the path of the student, by adding to his conceit, in a word, by taking a step in the direction of making the career of the civil en-

gineer from the school up to the chief engineer analogous to that of the West Pointer or of the Government Engineer in Europe, we deviate from the way in which engineering in this country has attained its high standard. The Society does not gain; the student is liable, in my judgment, to lose as much in force of character as he may gain in knowledge, and the young man who works his way up in our profession, without the advantage of a college education, is placed at an additional disadvantage.

I, for one, am opposed to the amendment as far as it relates to a student's grade.

Mr. C. S. MASTEN (by letter).—I agree with the suggestion to strike out from the proposed amendments the clause creating a student grade.

Mr. EDWARD S. PHILBRICK (by letter).—As I shall not be able to be present at the Annual Meeting of the Society on the 18th, I wish to express through you my disapproval of the proposed amendment of the Constitution establishing the grade of students, for the following reasons, viz.:

The class of young men for whose benefit this change is proposed are already fully supplied with all the reading matter which they can well digest through the technical schools and public libraries within their access.

I think, therefore, that the probable encumbrance of this new class of members in the use of the Society's library and rooms, and the introduction of crude matter into papers and written discussions from this new source, would be much greater than would be justified by the probable advantages to the young men themselves.

I have for many years been acting on the Board of Government of the Massachusetts Institute of Technology, one of the best technical schools in our country, and it is well known to all its faculty that young men who are about to enter professional life are too apt to grapple with questions beyond their depth, and expect, with sanguine hopes, to solve in a few months many questions which have defied the acumen of past generations of scientific men. In short, such men are always "biting off more than they can chew."

The present status of this class of young men among us is far more favored in regard to resources for acquiring professional lore than in any other age or country with which we are familiar. What they need most is not mere reading matter and discussion, but practical work. They will learn more that is of real use to themselves at that age by joining a field party in Arizona, or even by stoking a locomotive for a few months, than by digging in our library for a year.

That library is of great value to the working engineer, the man who has to meet new questions in physics or constructive work, and who must qualify himself to grapple with them by the experience of others in the same field. Such questions can never be foreseen by the student. If he attempts to study them all, he will have to spend his whole life in

the library. He may then become a walking encyclopedia, but not an engineer. I should therefore favor the proposed amendment to the amendment.

Mr. A. GOTTLIEB (by letter).—I agree with the proposition to strike out of the amendment the creation of a student grade. I do not agree with other points in the circular, lengthening the time of previous practice, as I think that the important point is not the number of years, but the actual responsible charge of work.

Mr. AMORY COFFIN (by letter).—I heartily approve the objections to the proposed student's grade.

Mr. D. M. GREENE (by letter).—I am in favor of striking out the proposed new grade of student.

Mr. JAMES L. RANDOLPH (by letter).—I approve the idea of striking out the provision for a student grade. I think the requirements for Associate open the doors wide enough. To me the student grade seems like setting up an opposition to the Engineering News, Railroad Gazette, etc., and to schools.

Mr. WM. PIERSON JUDSON (by letter).—I fully agree with views expressed in the circular dated January 5th, 1888, regarding the proposed amendments to Articles XVI and XVII of the Constitution.

Even if there is a demand, which I doubt, for the suggested Kindergarten Annex, the Society cannot make the change without lowering its standing.

In Article XVII, also, your form of amendment is much to be preferred for the same reason.

Mr. CLEMENS HERSCHEL (by letter).—The matter referred to in the circular has been quite fully discussed, and I will only say that I am glad this stand has been taken, the sentiments of which will, I trust, prevail in the society.

Capt. O. E. MICHAELIS (by letter).—I cordially approve the amendments offered in the circular.

Mr. JOHN A. FULTON (by letter).—Concerning the proposed grade of "Student of the Society," it appears to me that having become such a student the enterprising young man will be likely to mention as a part of his credentials, and truthfully too, that he "belongs" to the Am. Soc. C. E.

The person to whom he applies for work will ordinarily know nothing whatever of the various grades of membership, and will be very apt to think that an engineering society that would admit as members persons having only "youth and inexperience to recommend them," cannot be entitled to any great amount of respect.

It seems as if the adoption of such a measure would have a tendency to injure the Society's present standing without having the virtue of benefiting the "Student of the Society," who, however well meaning in his intentions, will appear to the average public as something of an impostor.

I am in favor of the amendment to the amendment of Article XVI, and am in favor of the amendment to the amendment of Article XVII.

Mr. LEWIS KINGMAN (by letter).—I think it to the interest of the Society that the amendment proposed to strike out that portion in reference to students and amend the rest of the Article as the circular suggests, should be carried, and I will vote for those amendments.

Mr. JOHN A. WILSON (by letter).—As to the matter of students, and the definition of the term Civil Engineer, I fully concur in the views expressed in the circular.

The proposition to create a grade of students in the Society, probably is based on the existence of a student grade in the Institution of Civil Engineers of England. An examination of the constitution of that institution shows that to make a man eligible as a student he must be a pupil of a corporate member of the institution. In this country the circumstances are entirely different, and we have no system of apprenticeship or of articled students in engineering offices. The English institution does not throw its doors open to all indiscriminately who fancy that they would like to become engineers, and I see no good reason why our Society should do so. The way in which the subordinate positions on engineering work are manned in this country makes it almost impossible to discriminate or to establish any definite rule by which admissions to a student grade could be regulated, and the practical result of establishing such a grade would be to flood the Society with an element that would not only be objectionable but a positive nuisance.

I do not, however, agree with the proposed change in the name of that grade which now is classed as Juniors, and would suggest that the name Junior Member be adopted. Is it not a mistake to have a grade of Associate Members and also a grade of Associates? It seems to me that the term Associate Member is a misnomer. As proposed in your amendments an Associate is not a Civil Engineer, and therefore cannot become a member; but an "Associate" or Junior Member, being a Civil Engineer, can become a full member. The class which you now propose to call Associate Members are in reality Junior Members, both in fact and by definition. I would therefore suggest that your amendment be further amended by changing the name Associate Members to Junior Members.

The other points in the amendments more clearly define the status of the various grades in the Society, and avoid much of the ambiguity which now exists as to where applicants for admission to the Society should be classed. With the exception which I have made I am decidedly in favor of the amendments as you propose to make them.

Mr. JOSEPH M. WILSON, Mr. CHARLES G. DARRACH, Mr. HENRY W. WILSON, and Mr. HENRY B. SEAMAN (by letter).—We concur in the views expressed in the foregoing letter of Mr. John A. Wilson on the subject of amendments to the Constitution.

Mr. J. S. SEWALL (by letter).—I think the proposed amendments to Acticles XVI and XVII of the Constitution ought to be amended by striking out the sections creating and defining the grade of students. I also approve the other verbal amendments to the proposed Article XVII as printed in your circular dated January 5th, 1888.

Mr. H. W. CLARKE (by letter).—The term Civil Engineer is certainly broad enough to cover all classes who are now eligible to election as Member. Eligibility is, I think, much better defined in the amendment as proposed in the circular than in the original article.

With so many well equipped scientific schools in the country, I do not see the necessity of formally establishing a student grade. I think there is nothing in the present Constitution or By-Laws which totally debars a bright young man, studying in the office of a member, from referring to books in the library when the privilege may be asked by his chief. And I think our meetings are not so secret but that any reputable Non-member, introduced by a Member, may attend them.

Mr. HENRY N. BABCOCK (by letter).—I was surprised at the way in which the Convention last summer (which I could not attend) was carried away with the idea of infant baptism, so to speak, attempting to supervise the education of prospective engineers and to receive them into the Society before they have decided what their occupation is to be. It is a sort of missionary work proper enough for the colleges and their professors, but seems outside the purpose of a Society of Engineers.

Mr. JAMES G. DAGRON (by letter).—I am heartily in favor of the proposed raising of the standard for admission to the different grades of membership. The Society should, above all, aim at quality and not quantity, so that it may truly become the representative body of American engineering, to be elected a member of which should be the highest honor that could be rendered an engineer by his peers.

I am opposed to the proposed grade of student, for the reason that while many young men study engineering and think they are called to the profession, on the other hand, but few are chosen; for many find on entering practical life, that their inclinations and aptitudes lead them in other directions. Therefore it would seem unwise to give them any connection with the Society until they have shown by a continuance of actual practice in engineering, that they will persevere in the profession. The grade of student in the Institution of Civil Engineers answers to a want which cannot well be said to obtain in this country. In England, young men desirous of entering the profession, do not, as a rule, attend special schools, nor pursue special studies, but enter the office of a practicing engineer, where they become veritable apprentices; after some years of this practical training, they start out for themselves as full-fledged engineers. In this country, on the contrary, theoretical education in one or another of the many Engineering Schools now extant, is obtained before entering upon practical life. This custom

is becoming the rule instead of the exception, and although the standard of many of the Engineering Schools could stand judicious raising, the time is coming when it will be fully recognized that any young man who enters the profession without preliminary theoretical training will do so considerably handicapped in the race for professional advancement.

I believe that in France and Germany, where preliminary theoretical education is the rule and not the exception, none of the professional societies have ever felt the need of or created a grade of student. I fail to see wherein such a grade would add to the standing of the Society, and if a lower grade than the proposed one of Associate Member is needed, why not retain the present grade of Junior with its present requirements, which are surely low enough.

I believe that the full period of study at an Engineering School should not be considered as equivalent to the same length of time spent in actual practice of the profession.

On the grounds above stated, I am in favor of the proposed amendment to Articles 16 and 17 of the Constitution, as proposed by the circular.

The proposed amendment D to Article XIX is, I think, a step in the wrong direction. It would seem to me to be unwise, impolitic and unsafe to place the election to membership in the hands of a majority of the Board of Direction, which might become a close corporation and wield its power to the detriment of the Society's best interests. With the elections to membership controlled by the membership at large as at present and a strict Board of Directors to closely scrutinize applications, it would seem that it would be more difficult for unfit candidates to secure elections, as in most cases they are known to members other than their five proposers, and these latter in case of known unfitness have thus a chance to communicate their knowledge to the Board of Direction for action. Any injustice that might be done to a candidate through prejudicial black-balling would be offset by the proposed amendment C to Article XIX if adopted.

Gen. W. S. Rosecrans (by letter).—I think the proposed amendment to Article XVI of our Constitution objectionable. We ought not to create the grade of student. In my judgment, the effect of it would be to lower instead of to elevate the dignity of membership, which ought to be sought and attained only by solid experience and thorough work.

For this reason, wherever the clauses concerning students occur in the proposed amendments to the Constitution, they should be stricken out.

For the proposed amendment to Article XVII, I prefer that suggested by the circular.

Mr. D. Farrand Henry (by letter).—Certainly, I agree with the circular. If members want their children educated—which, I presume,

is the true inwardness of this move—there are plenty of places where they can be sent without making a "district school" of the Society.

I should say, let the children of members have use of the library when in the city, but before they can become connected with the Society, let them be engineers in something beyond "intent." Civil Engineer is a generic term and should be retained.

The other points are good and consequential.

Mr. GEORGE Y. WISNER (by letter)—I fully agree in the objections to the proposed amendment to the Constitution, that the Society is not intended to be an institute for primary education, and besides, I fail to see how the proposed student grade can accomplish even that purpose outside of the few who may join in New York City.

Mr. FRED. BROOKS (by letter).—I think fairness requires that the Society should have the opportunity of voting by letter-ballot on the question of establishing a grade of students. The annual meeting may determine what particular conditions of admission of students shall be the subject of the letter-ballot; it may recommend that any amendments to the Constitution proposed for establishing a grade of students be not adopted; but it ought not to cut off from submission to letter-ballot some such proposed amendments. A motion to that end might, in my judgment, be ruled out of order as impertinent.

Col. J. W. ADAMS (by letter).—The objections to creating this grade of students are so tersely and happily expressed in the circular, that nothing which I could say would add one particle to its force.

There are those who are ready to write pages of weak argument in favor of that grade being introduced. I have read some of it, and I know the writers as advocates for bringing the entire body of self-styled engineers in the United States, if possible, into the American Society of Civil Engineers, on the ground that numbers alone confer strength, thus lowering the standard of the Society in the public eye (for the dollars they bring), to that of a mere "Union" of workers in the same business, where individual qualifications may be what they may.

I read this morning as an argument for the new grade, "Who can, in cold blood, object to the granting of such limited privileges as these (alluding to the student grade) to every qualified and vouched-for applicant, who wants them and is willing to pay for them." The "wanting and willing to pay" was not considered as a valid argument even for selling our Transactions in open market, still less should it be for selling our good name.

And another "in the Institution of Civil Engineers, they (the students) are nearly as large in number as the grade of member." How long, I would ask, would it be, here, before some such advertisement as this would appear:

"Mr. ——— is open to an engagement as engineer to any company about to undertake public improvements. Late a student in the American Society of Civil Engineers. Terms moderate."

There are scores of educational asylums throughout our country ready to confer the degree of full-fledged Civil Engineer on its graduates. Is our Society equipped for going into competition with these, and manufacturing engineers at a much cheaper outlay?

No—my advice would be, to open your doors to no one (aspiring to engineering honors) of any grade, unless he brought with him something of professional experience and reputation to add to the common stock.

Mr. A. M. WELLINGTON.—Since Colonel Adams has seen fit to specifically refer to certain statements written by me and published in *Engineering News* of January 14, 1888, I must request the republication of the part of the article to which he more directly refers, in order that members may judge for themselves how fair and how well founded is the interpretation which he has seen fit to put upon one or two expressions; premising only that for a person to enter the student or any other grade in this or any other Society he must have the four qualifications enumerated below, viz.: (1) He must be properly qualified; (2) he must be properly vouched for; (3) he must want the privileges of the Society; (4) he must be willing to pay for them. The following is the extract referred to:

"Is it, or is it not, the view of a majority of the Society that 'the mere desire to learn and the hope of future benefit by association,' combined as it must be of necessity with good moral character and standing and a certain minimum of study or experience, is an insufficient qualification for admission to any grade of the Society, either actual or potential? To the vast majority of the Society such a question will almost answer itself. If the 'mere' 'desire to learn and hope of future benefit' are not a sufficient qualification for the limited privileges which it is proposed to grant to these 'novices in professional work,' what are sufficient grounds for such gracious favors? What are these privileges? They may be all listed thus: (1) To pay $6 to $10 per year; (2) to receive the printed publications of the Society; (3) to present papers and written (not oral) discussions, which if deemed worthy will be printed, and if not will be waste-basketed; (4) to have their names and addresses printed in the Society lists in a separate roll; (5) to use the library and rooms of the Society to the extent and in the manner which the Board of Direction approve of from time to time; (6) to attend (not take part in) certain of its meetings, subject to the same provisions, until such time shall come that the Board thinks it better to provide for special meetings of students, as in England, and to exclude them altogether from the regular meetings. Even these privileges no one can obtain if a single member of the Board of Direction objects, and he holds them only during the will of the majority of that Board or until attaining the age of twenty-seven years, when they cease abruptly and he is dropped from the rolls of the Society, unless he has previously been elected to one of the permanent grades.

"Surely he must have a somewhat dog-in-the-mangerish disposition who can in cold blood—and realizing what he is doing—object to the granting of such limited privileges as these to every properly qualified and vouched-for applicant who wants them and is willing to pay for them. If it will in fact make the society 'an institution for primary education,' or for any other kind of education, which it is not now, so much the better. The gentlemen who issue the circular boldly assert that that is not a purpose of the Society, but unless it can be shown that it will not tend to 'the advancement of engineering in its several branches,' or will do more than corresponding damage to the other work of the Society, we are compelled to differ from them. To assert that it will do such damage, as for instance, tend to 'dilute' the Society, is indeed possible, but only by ignoring plain facts. On the contrary, a chief merit of the proposed measure is that it will make it possible to maintain what is not now maintained, a really high standard for admission to the higher grades. The 'dilution' comes in in attempting to crowd all grades of experience into one or two grades, as the only alternative to excluding altogether; and it has had, and will continue to have, unless corrected, a very injurious effect upon the standard for full membership."

As statements in various of the letters which have been read seem to be based on a misapprehension of facts, I desire to add further that the requirements for the admission of students to the Institution of Civil Engineers are much lower than those fixed in these amendments, being thus set forth in the form of proposal: "That he is upwards of eighteen years of age and is under twenty-five years of age; and is, or has been, *bona fide*, in the course of preparation and training under me with the object of becoming engaged in the design or in the construction of such works as are comprised within the profession of a civil engineer, as defined by the charter." I am informed that a very large and rapidly increasing proportion of those who enter as students, do so as undergraduates, or very recent graduates, of the numerous engineering colleges in England; such as Kings College; Owens College, Manchester; Liverpool College; Edinburgh School of Engineering; Glasgow University; University of Cambridge (which has a fine school of engineering connected with it); Chatham Military School, and others. As soon as a young man enters any of these colleges he is eligible as a student of the Institution if over eighteen, and I am informed that many so enter. As it will hardly be claimed that the Institution of Civil Engineers is engaged in "primary education" in any objectionable sense, the objections raised to this measure on that score, which seem to be the principal solid basis of objection, fall to the ground.

Mr. M. COHEN.—Mr. President, it seems to me that this matter resolves itself simply to this: what is the benefit to the American Society of Civil Engineers from the adoption of these amendments? There may possibly be another question that we all propose to answer, somewhat

different from the first, and that is, whether the ultimate benefit to the American Society of Civil Engineers will be sufficient to warrant the immediate benefit to somebody else. The benefit to the Society can only be from the sale of some of its Transactions and Proceedings to the new student. Even supposing that we may be greatly benefited by the papers which these young men may be capable of producing and reading before us, there would not probably be a great many of these, so that all we would gain would be the sale of our Transactions. Now, what would be the benefit to future members? We will introduce here a number of young men as students who will attend the meetings of the Society, and will use, to some extent, its library. These young men will, in exchange for a moderate fee, have these facilities and receive the Transactions.

They may be benefited, it is true. Would they not receive precisely the same benefit by receiving the Transactions only? I think they would. The facilities of the library here could only be used by resident students; those residing in the City of New York. And where are there students of civil engineering in the City of New York? Our American Society is not the Institution of Civil Engineers; they are entirely different. We have no student apprentices. The students are the scholars of the various technical schools in the city and its neighborhood; they may be benefited; they can come down here to these meetings of the American Society of Civil Engineers, and after the meetings—they can go somewhere else, if they desire. And what is the ultimate benefit to us? I say, nothing. The mass of our students of engineering throughout the country are scattered over the broad land. They cannot get any benefit except from the receipt of the Transactions; the only benefit to them is their receipt, for a small consideration, of our Transactions.

There is another view of that branch of the subject. The local schools then could recommend to the parent the great facilities that his son would enjoy by his proximity to the Society of Civil Engineers; that he had only first to attend the school and then could be readily admitted to associate with these gentlemen, and you can readily see the benefits to be derived thereby by these schools. It helps the schools in the neighborhood, but I don't see that it helps the Society. It seems to me that all that is desired by those who advocate this measure can be reached without interfering with the Constitution.

Mr. William H. Paine.—I would like to say, as one of the Committee upon that amendment by which students could be admitted to this Society, that I did not attend the Convention. I was myself personally opposed to the whole scheme, but as it seemed the sense of the Convention at the time that Committee was appointed, to have the student grade added to the other grades, it remained the duty of that Committee, that some way should be arranged, and such alterations of the Constitution should be made as was necessary, and that those alterations should

be considered and brought forward by that Committee. We have, with all due diligence, labored to make that arrangement of the Constitution which will permit this adding of the new grade; yet, on the question of whether the student grade be adopted or not, I shall vote to the contrary, although a member of that Committee.

Mr. THEODORE COOPER.—Mr. President, at the Convention I took the stand of opposition to the admission of students, and I think my opposition has been fully indorsed by the committee who arranged the proposed amendments; they acknowledge what I claimed, that there was no room at the bottom in this Society, but that there was room at the top. They have raised the standard for all grades of membership in the Society. As the amendment now stands, there is no objection to it—even with the student grade in it, as they now put it. Now, I desire to retreat from all further opposition, and I indorse the proposed amendment for the reason that there are no students to come into this Society. There is no demand by young men or boys; we might have a dozen students at the end of the year, but they would probably withdraw at the end of the next year. The American boy is not willing to acknowledge his inferiority to the President of the Society. You cannot get at the young man who wants to join the Society in this way; he will not come in as a student; he will wait till he can come in some other grade. In fact, take the young men who are almost old enough to come in as Members, as the case is now; they say, "We don't want to enter the Society as Juniors; we will wait a year longer and become Members." At the Convention one of our able engineers mentioned that he had forty young men who had been under his employ in the great aqueduct waiting to come into the Society as students; that they were waiting for this amendment to come in as students. I think they are waiting to come in as members.

I don't believe there is any demand at all for such a thing; therefore I say there is no harm in having this amendment passed; it will only cost a few extra lines of printing in our Constitution. But taking this whole matter as it stands, it is excellent; it is raising the grade of our membership, and I would rather see the whole amendment passed as it stands to-day than lose all by wiping out the student grade. But in the discussion of the student grade and of the amendments to the Constitution, we have got to be very careful to see that they do not conflict with many other things. After this discussion I hope some gentleman will move that the whole subject be referred to a committee, so that we can get it in good shape. There are matters of composition, and there are one or two very vital points to be considered. For instance, at the end of the first clause—"Members of the class previously styled Juniors shall, after March 7th, 1888, be classed as Associate Members." I object to that. Ought not the men who are now Juniors come into the Society the same as any other member and be classed according to their qualifications? Why should we

pass them along? I am not reflecting on any one; I am not reflecting on any member of the Junior class, but if they are worthy let us pass them, and if unworthy let us sift them out. I may mention one case of a man who has been a Junior for nearly fifteen years. Now, are we going to pass that man without an examination? I say they should be tested to know whether they are qualified. Having done that, I have no objection to the amendment as now presented.

Mr. ROBERT MOORE.—Mr. President, what is the question?

The PRESIDENT.—Under the Constitution, these amendments are open for discussion.

Mr. MOORE.—Is there a vote to be taken on them?

The PRESIDENT.—There is a vote to be taken upon them by letter-ballot, as they now are, if not amended; if amended, as amended. The vote is to be taken by letter-ballot of the whole Society.

Mr. CROES.—Any amendments pertinent to the original resolution may be made at this meeting; if approved by the Annual Meeting, the amendment in that shape goes out, and only in that shape; there is no alternative ballot; there is an absolute ballot on the amendment as now perfected. This is to give an opportunity for any alterations of the amendments which may be found necessary by the Annual Meeting. If there are any amendments to be made pertinent to the character of the whole amendment, they can be made here.

Mr. E. P. NORTH.—Is it impossible, Mr. President, to vote on this amendment in parts; can it be presented in two different sections? That is, to take what is generally regarded as an improvement, the raising the standard of Members and Associates as one question, and the question as to the admission of the student grade as another? I believe there is no objection to raising the standard; the only question is in regard to the admission of students. Can this amendment be put out in two sections, so that a man can vote on one and not on the other?

The PRESIDENT.—As I understand it, this amendment has to be voted upon as a whole, not in parts.

A MEMBER.—We could not strike out one part of that amendment and have it amended as pertinent to the original amendment; that would be very impertinent. We must vote for it as it stands; we surely cannot strike out one part of it and have it remain pertinent.

Mr. CROES.—That is precisely why the proposed amendment to the amendments was withdrawn.

Mr. T. C. KEEFER.—I think there has been some misapprehension in regard to what is a student in the English Institution. That studentship is not confined to apprentices and articled clerks; it is open to students in the engineering classes in any of the colleges of the Empire. We have in Montreal, in the engineering class in McGill College, students of the Institution of Civil Engineers.

Mr. ROBERT MOORE.—Mr. President, as one of the committee which

presented these resolutions, I may perhaps explain somewhat the position of the committee. As we understood our duties in the matter, it was to formulate amendments to the Constitution which should admit the grade of students, whether we personally favored that grade or not. We understood that the meeting at the Kaaterskill had been, on the whole, favorable to the admission of the student grade in some form; the question then arose as to the form in which such a grade should be admitted. In canvassing the matter, it seemed to us very clear that there was no room for the admission of this grade, except by advancing all the other grades. The only thing we could do was either to raise the standard of all the grades or to declare that we could not formulate any proper method by which the student grade could be admitted. It required changes in the Constitution advancing the grades of membership, and introducing the additional grade of Associate Member, and so making the grades of membership correspond to the grades of the Institution of Civil Engineers. After a great deal of conversation and reflection we concluded to make the recommendation as it stands now. Provided, and only provided, that the other grades of membership were advanced, we would recommend that the grade of students be admitted, and I think that the committee were unanimous in feeling that, unless the whole amendment could go together, we were opposed to the admission of the grade at all. There were some other points on which the committee were not unanimous. The terms of the amendment as proposed were not satisfactory altogether to the committee, and without some further amendment I think that the members of the committee would not be sorry to see the whole proposition defeated. I refer particularly to the matter of associate membership. To some of us it seemed of very doubtful propriety to admit a second grade of membership to be called Associate Member. It seemed of doubtful propriety, unless we could postpone the admission of a person to membership until they had reached maturity of years, until they had had practical experience sufficient to show what they were made of, so that we found we were all agreed in postponing the time of admission to membership until the age of thirty, increasing the requirements as to experience, and also providing a grade of Associate Members of young men of less experience; but, as the amendment now stands, a man might be an Associate Member for life, and on that there was a divergence of opinion in the committee, and a further amendment to these articles was drawn up by Mr. McMath, one of the members of the committee.

But I would personally prefer to see this proposed amendment made still more sweeping. I would like to propose a further amendment to Article XVII, that the connection with the Society of Associate Members who are not transferred to the grade of Member or Associate (in which latter grade a man need not be a civil engineer at all), ten years after admission to Associate Membership, shall cease. The idea is that, unless they are

transferred to membership at the end of ten years, they shall cease to be members at all.

Mr. CROES.—Is Mr. Moore ready to offer such an amendment now?

Mr. MOORE.—Yes, sir.

Mr. CROES.—We want to have a definite proposition before us. I intended to move that the amendment be sent out without amendment. You move to amend?

Mr. MOORE.—Yes, sir.

Mr. E. S. GOULD.—Mr. President, I wish to say that I am very much opposed to the creation of the student grade. So much has been said against the creation of this grade, and my own views have been so much better expressed by other members than I could have done, that I could perhaps only say what has already been said. But I will say that I am, myself, very much opposed to the creation of such a grade. I think it would be a mutual disadvantage instead of a mutual benefit. As every point almost has been gone over thoroughly and well, I would simply say that it seems to me the only advantage to the Society from this grade would be the fees which it might add to the treasury; and as to the students themselves, I entirely coincide with the views already expressed, that they would derive a very slight benefit from such a limited association as this. There has been a great deal said in excuse of the creation of such a grade, that the young men would not avail themselves of it, and that they would be very generally gotten rid of, and that would be one reason why there would be very little harm in their admission; but, under those circumstances, there would be very little reason for the creation of such a grade, and I shall certainly vote against the proposed amendment.

The SECRETARY.—Mr. President, Professor Burr, Member of the Society, has forwarded the following discussion on this subject:

Mr. WILLIAM H. BURR (by letter).—The propriety of this amendment rests primarily on the scope of the Constitution, for if the objects of the Society, as set forth in that instrument, do not permit the formation of such a grade as that of "students," it is idle to discuss the feasibility or advisability of its creation. Article II of the Constitution reads as follows:

"Its objects shall be: The professional improvement of its members, the encouragement of social intercourse among men of practical science, the advancement of engineering in its several branches, and the establishment of a central point of reference and union for its members."

Now, it may be a matter of opinion just how much "intercourse among men of practical science" is to be encouraged by embracing in the list of the Society's members young men eighteen to twenty-seven years of age; but as "men of practical science" must pass the years included between these limits, it is difficult to imagine why intercourse among them to some extent would not be encouraged in the contem-

plated grade, except the Society lack capacity for such encouragement, or unless the man of science begins to be practical only at the age of twenty-seven or at some later period. But probably no one would admit either of these alternatives. Few are the engineers who do not begin their practical career at or before the age of twenty-one, and it is not difficult to find engineering students who use a considerable percentage of their time in practice at the age of eighteen.

Nor, I believe, can it be fairly denied that the proposed grade would advance engineering in its several branches, which the Constitution states as the third object of the Society. Any action by which young men who are preparing, or have prepared themselves to practice engineering in its several branches are brought in agreeable contact with older members of their chosen profession, will tend to give them a peculiar equipment for their duties which they could scarcely otherwise acquire. The growth of technical ideas will be more healthy, a better judgment will be developed and a stronger common sense, besides that finish and cultivation of the individual which contact with mature professional men is sure to confer on those of less experience. Such benefits enjoyed by those who are and are becoming engineers cannot fail to materially improve the quality of their work in after life when they reach positions of responsibility. Now, these same students will almost invariably become either members or associates; and let it be remembered that whatever improves the members of the Society vastly improves the Society itself. It would thus receive through a properly created grade of students constantly increasing benefits. A high professional tone or character in its individual members will enhance, in a multiplied degree, the position and influence of the Society as a body, and no means should be neglected to accomplish so desirable a result, so long as it is within the proper scope of the Constitution.

We are told that the Society is not an institution for primary education, which is unquestionably true, but has no proper bearing on the proposed amendment. If it is meant that the Society should divest itself of everything of an educational character, there will be little left worth saving. Of all the educational influences or forces valued and encouraged by the Society, that of experience is the greatest. When a man ceases to learn or be educated in the broad sense of the word, he ceases to live; from that time on he simply exists, exhausting his accumulated capital of experience and soon becoming a mental bankrupt in the activities of life.

Again we are told that the Society is an association of "skilled and experienced engineers," although the Constitution makes no such statement and has for many years provided for a class of young professional men whose experience and years are not sufficient to entitle them to the rights and privileges of full membership. Any such narrow and trade-like restriction savors altogether too strongly of the trade union to form

a basis of action of a society of professional men. Broad principles, generous motives and high aim should characterize every feature of such an organization, and the statement derives emphasis from the success of the strongest engineering organization in existence at the present day.

The fact that young men would enter the grade of student with the desire to learn and the hope of benefit by association, is to my mind not only an argument for its existence, but a positive demand for its creation. If the Society could recruit its members from a body of young men actuated by an earnest desire to learn, and who had devoted years and means to the effort, and who are constantly moved to exertion by the hope of future benefit of association with those whose high principles and great success they emulate, I venture to say that its success would be far beyond that for which we now dare to hope. But aside from the bearing of this objection on the student grade, I believe it is safe to say that if the Society were to lose to-day all those who cherished a hope of future benefit by association when they joined, the honors of such an ideal membership would rest on the heads of an amazingly small number of individuals.

The grade of student, like all other grades, should be most jealously guarded, to the end that no unworthy applicant should enter. It seems to me that the age limits in the proposed amendment to Article XVI are judiciously placed; but I think the qualifications in the proposed amendment to Article XVII are much too low. At the end of the first year's study at a technical school, it is probable that a determination or real "intent" to pursue the study of engineering has been developed in a small minority of its students only. In the first-class technical schools of the country, probably not much more than one-third of those who begin the course of study pursue it to a successful termination, and few of the two-thirds who abandon it follow the business of engineering, and yet nearly all of those two-thirds complete the studies of the first year. I think, therefore, that the qualification should stand at least as follows: A student shall be one not less than eighteen nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer, and who has pursued that study at a technical school not less than two years, and who, at the end of that time is in full standing in his studies; or one who shall have been engaged in the study and practice of engineering under a competent engineer for not less than three years, and who shall be subject to an examination at that time under the supervision of the Board of Direction.

I do not believe that anything less than this will assure that "intent to become an engineer," which the spirit of the amendment requires. The general character of the examination which would vary to some extent for different cases, could easily be prescribed.

Mr. MOORE.—Mr. President, the amendment which I would offer is this:

Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member shall cease to have any connection with the Society.

Mr. W. H. WHITE.—Mr. President, I think it is pretty clear that this thing will have to be revised in some fashion. I would move that the amendments be again submitted to the Committee, with instructions to revise and return them at the earliest possible future date.

Mr. CROES.—Mr. President, there is no use of discussing this suggestion; these amendments have to go out for ballot. Nothing that this meeting can do can prevent it.

Mr. WHITE.—Is that constitutional?

The PRESIDENT.—It is.

Mr. THEODORE COOPER.—The intent of Mr. White's motion can, and ought to be carried out; that after any amendments which may be offered at this meeting have been made, it will be well to refer the whole to some committee, so as to make them harmonious, this committee to report later in the day. It is impossible to adopt a number of individual suggestions as amendments, and have the whole thing harmonious and complete.

I therefore offer the following motion:

Resolved, That after the individual amendments are discussed and acted upon, a committee be appointed to take up the subject and put it in proper form and make it harmonious for presentation to this meeting at a later hour to-day, or at another session of this Annual Meeting.

This motion was carried.

Mr. A. M. WELLINGTON.—Mr. President, I believe Mr. Croes' motion is before the meeting. I sincerely hope that Mr. Moore's motion will not pass, for this reason: I am, myself, a great respecter of precedent. So long as we follow the Institution of Civil Engineers—which was the original of all Engineering Societies, which has been a most brilliant success, which has over 5 000 members, and has a higher standard of admission than any other Society—so long as we follow what they have done, we are, I think, safe; but when we depart very radically from what they have done, and make not only a grade of students, but a higher grade of Associate Members merely provisional, we are going too far beyond what that precedent would warrant, and venturing, I think, on dangerous grounds. There are very good reasons why a grade of students should be a temporary grade, from which a man drops if he is not admitted to the higher grades. He may, by the time he has reached the limits of age, abandon the profession altogether, and in that case it is not desirable that he should continue his connection with the Society; but when a man has reached a maturer age and becomes an Associate Member, I see no reason why he should not do so on a permanent basis, nor why he should be dropped altogether from the Society if he does not go higher than this after a certain number of years. We all know

that there are engineers under the grade of Members, that there are many men in the Junior grade, who never rise to high positions, men who are excellent assistants, but who are not qualified to become Members, and never will be. It is not best to say to such men as these that they shall drop out of the Society altogether, although it is desirable that they should not be passed on to a higher grade.

While I am on my feet I will say a word with regard to another question. I have been gratified by part of what Mr. Cohen says; it illustrates the small ground for a great many of the objections to this proposed grade of students that have so far been brought forward. In establishing this grade it was proposed to follow exactly the precedent of the Institution of Civil Engineers. In that institution the grade of students is nearly as large as the grade of Members. The student grade during the past year numbered 934, while the Members were 1,581 in number, the Associate Members 2,340, and the Associates 475.

In the communications which have been read there have been repeated references to such statements as making the Society an organization for "infant baptism," "turning it into a Kindergarten," etc., etc. Unless they are prepared to make the same charges against the Institution of Civil Engineers, those gentlemen are displaying their own utter ignorance of the workings of that Institution. Does any one suppose that that is an organization for "infant baptism," or that their student grade is a "Kindergarten annex?" Another gentlemen points out that in the French and German Engineering Societies there are no grades corresponding to a student grade. Now, granting that for the sake of the argument, if we compare the French and German Societies with the English Institution, which is the one that this Society would most care to resemble? Certainly the Institution of Civil Engineers, which is a more weighty and influential body, perhaps, than all other engineering organizations put together. In England, every Engineer of any reputation belongs to the Institution of Civil Engineers; he cannot exercise any influence at all professionally unless he belongs to it, and I hope to see the same state of things in this country, that it will be a necessity for good professional standing to belong to the American Society of Civil Engineers. It is for that very reason that I desire and have advocated most heartily the passage of these amendments, because I think there should be an opportunity for every reputable young man, who desires the professional advantage which he may derive from the reading of our papers, etc., and the assistance which he may derive from having his name on our list of members, to be able to avail himself of these advantages. The latter object is a perfectly legitimate one; it brings a great many full Members into the Society, and I have no doubt it has a great deal to do with the students in England joining the Institution. You have only to take up any of the English Engineering journals and you will find plenty of young men who are in

want of a position, stating in their advertisement that they are "students of the Institution of Civil Engineers." Why not? It speaks well for the young man in every way that he should belong to the Institution, and also, it shows that he has the qualifications necessary to get in.

The only other point that I desire to mention is in regard to the comments already alluded to, to the effect that "these privileges should be granted to every properly qualified and vouched-for applicant, who wants them and is willing to pay for them." There never has been in my mind any idea that the creation of a new junior grade of students would bring in any great amount of additional money to the treasury of the Society. The indirect benefit to the Society will, I believe, in many ways be great, but the proposition is not founded on any desire to increase the Society funds, nor is it fair to so represent it; but I say that any properly qualified young man who desires the advantage he may get from receiving our Transactions and from his connection with the Society should be allowed these privileges, both for the Society's sake and his own. I have myself had four or five applications from young men, desiring to know how they can become students of the Society. I simply answered these young men that the matter was to come up and be acted upon at this meeting. I am convinced that there is a considerable number of young men throughout the country who will gladly avail themselves of the privileges of the grade, if it is created; but if there be only one, why should the privileges be denied him? I certainly think, as I have said before, that we should for every reason be glad to give to "every properly qualified and vouched-for" applicant the scanty, yet to him important privileges, which it is proposed to give in this new grade, accompanied as it is by a needed and important increase in the qualifications for the higher grades.

Mr. D. FitzGerald.—Mr. President, I am one of those who believe that the proposed addition to the Society is an unnecessary one. We now have Members, Juniors and Associates, and the addition of this student grade is one that is not going to add honor to the Society or value to the new grade. There is one point on which I should like to be informed, and that is in regard to the necessity or advisability of changing our name of Junior to that of Associate Member. It seems to me a very objectionable change to make. The word "Associate," whether you couple the word "Member" with it or not, carries to the mind of almost everybody who is connected with the Society the idea of a non-professional member, and I think that the present designation of Junior is far preferable. I hope it will be retained. The very word "Associate" conveys the idea of a member who is not an engineer. I would like to hear the reason for making this change.

Mr. P. Roberts, Jr.—Mr. President, would it not be well to hear from some of the young men? I am not a young man myself, although a little younger than some of those who have gone before me. Mr.

Wellington, who commences by saying, "It's English, you know," gives us a strong argument in favor of his views. In all that has been said by the members who are in favor of this amendment, we have had no objection from those members of the Society whom I may term the college professors. They, so far as I understand, are in favor of the proposed amendment.

Mr. CROES.—Mr. E. S. Philbrick is connected with the Massachusetts Institute of Technology, and Mr. D. M. Greene is the Director of the Rensselaer Polytechnic Institute of Troy.

Mr. P. ROBERTS, Jr.—These are the exceptions that prove the rule. I had so far heard no opinion as to this grade of students from our fellow members, the college professors. Now, I am well aware that a father has much pride in the advancement of his own children, and probably every member who is a father will remember the gratification he felt when his son had mastered the "*Pons Asinorum.*" So I think it is with much the same feeling of pride that the college professor would point to the student who had just read a most successful paper before the American Society of Civil Engineers. As a young man I remember very well with what pride I became a Junior of this Society, and after that a Member of the Society. I think a young man will work a little harder to become connected with the Society if he must show some record before he becomes one of us.

As to the matter of obtaining the Transactions, I doubt if there is such a great desire for these among college students. I confess, as a college boy myself, I would not have paid much for them. They can be consulted now in the libraries of most of our colleges, and they are thus within the reach of all those who may desire them.

Mr. FITZGERALD.—I move an amendment to the motion: that Associate Member be changed to Junior. I move this as an amendment to Mr. Moore's motion.

The SECRETARY.—Mr. Moore's motion is, that, Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member, shall cease to have any connection with the Society.

Mr. FITZGERALD.—I withdraw my motion for the present.

The question was then put upon the motion of Mr. Robert Moore, and the motion was declared lost.

The tellers then reported the result of the canvass of the ballot for officers as follows:

Total number of ballots received		272
Deduct without signature	2	
Voted a blue list	2	
Voted an annual meeting circular	1	
	—	5
Total ballots counted		267

For *President:* Mr. Thomas C. Keefer received 264; for *Vice-Presidents:* Mr. J. James R. Croes received 261; Mr. Robert Moore received 267; for *Secretary and Librarian:* Mr. John Bogart received 258; for *Treasurer:* Mr. George S. Greene, Jr., received 263; for *Directors:* Mr. Alphonse Fteley received 267; Mr. Charles B. Brush, 266; Mr. Stevenson Towle, 263; Mr. Joseph M. Wilson, 262; Mr. Mendes Cohen, 261.

A recess was then taken for lunch.

The session was resumed in the afternoon, Mr. WILLIAM G. HAMILTON, Director of the Society, in the chair in the temporary absence of the President.

The President elect, Mr. THOMAS C. KEEFER, was introduced by the Chair, and made a short address.

The discussion of proposed amendments was resumed.

Mr. C. B. BRUSH.—Mr. President, as I understand the method in which this discussion is being followed, we are to propose amendments and then discuss them. If that is so, I propose an amendment:

That all reference to student membership be stricken out from the amendments, and also, that the term, "Associate Member" be stricken out, and the term, "Junior" be restored, as at present.

Mr. Brush's motion was seconded.

Mr. BRUSH.—This motion having been seconded, I will proceed with the discussion.

The statement has been made that college professors have not expressed themselves clearly and definitely upon this subject. I have the honor of being a college professor, having been for fourteen years connected with the School of Engineering of the University of the City of New York. At the same time I have had the honor of being an active Civil Engineer for the past twenty years, and can speak in both capacities. These amendments, I am quite confident, will be of very little practical advantage to the Society, if passed; but what I wish to speak of is their relation to the students themselves.

Every advantage that a student can receive by reason of these amendments is stated here in the amendments; he "shall have the right to use the library and rooms of the Society, and to attend its meetings, subject to such regulations and restrictions as the Board of Direction may adopt."

The difficulty with a student is, as has already been stated, that he has an entirely too exalted idea of himself and of his knowledge of the profession, and it is absolutely essential that clearer views of life and truer views of his relation to the profession should be presented and inculcated in the minds of these students, and until that is done the student is not receptive. Now, I do not imagine that every student with whom I have come in contact is in the course of time to become so qualified in his profession as to become a Member of this Society; and if this student membership can be obtained with so little work as is provided here, the honor of a connection with the Society will most certainly diminish in his eyes.

Again, it is a matter of fact that the Transactions of this Society are to be found in the library of nearly every technical school in this country, and any student who can appreciate these Transactions can obtain access to them without difficulty at the present time. Any student who is a resident of the City of New York, or who wishes to consult the library of this Society, can do so by simply presenting a letter of recommendation to the Secretary, stating that the student is worthy of commendation, and asking the privilege of allowing him to consult the works on any subject that he may wish to consider. So that any one who desires may obtain these privileges without interfering with the rules of the Society.

In other words, the higher the standard, the more work the student will accomplish in order to reach that standard. If you lower the standard, the student himself will suffer.

One difficulty we have in all our technical schools is that too much is given the student to digest; he cannot digest what is given him. I think if we took a less number of studies and confined ourselves more to showing the student everything that was to be shown in them that he could grasp, the student might be a more valuable man to himself and to the Society. There are few of these papers that the student can really grasp; many of them are such as can only be understandingly read and appreciated by the practical engineer. And the professor always calls the attention of the student to such papers as may be of benefit to him, and points out such salient points as would escape the attention of the student alone. I think, from all points, the passage of this amendment would be an injudicious measure.

In relation to the other question, the class of Associate Member, I agree with what has been said that the term Junior conveys the idea of the grade of membership very much more clearly than the word Associate or Associate Member.

I am sure that the feeling which some of the members have expressed this morning, that the college professors were in favor of these amendments, is a mistake. I have had the pleasure of conversing with Professor Beardsley, a professor of Swarthmore College, in relation to the effect on the students themselves, and he thinks with me that it would not be good.

Mr. M. COHEN.—Mr. President, I myself have thought that there was no occasion for this change in the Constitution, and that there was no necessity for the introduction of a new grade. There has been, however, a considerable difference of opinion on this subject, and inasmuch as we have with us to-day as a guest, a member of the Institution of Civil Engineers, who has passed through the various grades of Student, Associate Member and finally Member—I refer to Professor Bovey, of McGill College, Canada—and I think that if he would favor us with some practical demonstration of the workings of this grade, and

the progress through the several grades of membership, it would be very valuable to us.

The CHAIR.—We would be very glad to hear from Professor Bovey.

Professor H. T. BOVEY.—I very much appreciate your kindness in asking me to give you my experience in this matter, although I had hoped to be only a listener to the very interesting discussions which have been going on.

I think there must be a great deal of misapprehension as to the workings of the student class in the English Institution. It is not at all necessary, in the first place, that a student should be apprenticed to a civil engineer; even while at college a young man may become a student of the Institution of Civil Engineers. I am a Cambridge man myself, and as soon as I left the university I became a student, without any qualification, except that I had a pretty good education and also had the intention of becoming a civil engineer. Afterwards I was apprenticed to the chief engineer of the Mersey Docks. During the time I was a student I derived the utmost advantage from being a student of the Institution, and the feeling among the great body of students is that they derive great and lasting advantages from being connected with the Institution. They have nothing to do with the Institution as members, they are merely students, and they are enabled by their connection with the Institution and by securing the Transactions, to obtain as much knowledge as they can digest of the practical experience of the working engineers. Every young fellow, every pupil of an engineer, as soon as he becomes a pupil, makes it a point to join the Institution; and all the chief engineers, all the engineers who hold the highest positions, invariably recommend their pupils to become students of the Institution, feeling that they will derive great advantages from this connection. I speak myself as a former student, and I think that possibly the advantage to non-residents may be just as great as to residents. They are sometimes located in distant parts of the empire, and so have great satisfaction during their absence in the knowledge that they will receive the Proceedings of the Institution as soon as they are published, and thus become well informed of all that is going on in engineering work.

I do not think the Institution at home has ever considered any direct advantage that might be derived from such a connection; they considered only the advantages it would confer upon the profession as a whole, and I have no doubt but that view would obtain just as strongly on this side of the water. Every engineer, every working engineer, wherever he is, is desirous of raising the standard of the profession as high as possible. How is that to be done? Are we to say to these young fellows who are getting a fairly good education and training, are we to say that they shall have no connection with an institution in which the practical experience of their elders is given, and no opportunity of attending the

meetings by which they might obtain a large amount of experience? Are we to exclude them from these advantages simply because they thus far have had no practice? I maintain that those students who cannot attend the meetings become very theoretically educated, and have, perhaps, a somewhat exalted idea of their own knowledge of the profession. Now, as soon as they are brought into contact with the views of practical experienced engineers, they begin to modify their own views a great deal, and the sooner those views are modified the better. How can you modify them better than by allowing these young men to come in and see where their views are harmonious with practice and where they are at variance with practice? If you allow them to come into the meetings, I do not think that you will ever find that they are too pushing or too ready to express their ideas; in fact, I think they are apt to be rather too modest; but, under any circumstances, they certainly modify their views very considerably. That was my experience. Before I had been connected with the Institution twelve months my views of the profession as a whole were very considerably changed.

A great deal has been said about the primary education of students. Well, I think if some of the Members would take the trouble to look into the Transactions of the Institution of Civil Engineers and just glance over some of the papers that have been written by students, they might modify their opinions on the subject. These papers are read by the students at their meetings. The meetings are presided over by a Member of the Council. Everything is conducted just as orderly and just as quietly as in the Members' meetings; the discussion goes on just as freely, and I think myself that some of the papers and discussions are very good. At the close of the discussions the whole proceedings are summed up by the Member presiding.

The Institution at home does not depend upon, nor is there any thought of any direct advantage to be derived from the students. The first intention was to benefit the profession at large, to raise the standard of the profession, and the idea was that this could best be done by preventing the acquisition of false ideas in the minds of students, by connecting them with the Institution and by giving them the Transactions, and allowing them to come to the meetings. The Institution of Civil Engineers was never so successful as it is now, and it derives a great advantage from filling up its membership from the student class; every time a ballot is taken you will see that so many students are transferred to the higher classes of membership. The Institution must undoubtedly depend in the end upon the students, who will become the engineers of the country. No sooner does a student get into practice than he desires to become a full member; and the sooner he becomes a full member the better it will be for the Institution and for the profession at large.

As to the possible change from Junior to Associate Member, of

course I am not qualified to speak, but I might perhaps say one thing. You all know how very much confusion there is as to University degrees of all kinds in Canada, and I believe, in the United States. We never know what a B.A. means or a Ph.D. means. One college would give a degree of Doctor of Philosophy for one class of attainments, and another for another. Now, I think it would be quite possible to harmonize all these titles, so that all over the world it would be known just exactly what qualifications at least a Member or an Associate or a student possessed. According to these amendments, if they were carried, there would be a perfect harmony of requirements and titles over the whole English-speaking race, and that, I think, would be a vast advantage, especially for the profession.

If a man were an Associate Member, they would know just what qualifications he possessed which qualified him as an Associate Member, and I think it would be a great advantage if we could only fix upon some classification which every engineering institution would adopt. So far as the Associate Membership class in England is concerned, there were originally but three classes. When I joined the Institution as a student there were but the three classes: Member, Associate and Students. Then, when they began to elect men who were not engineers to the class of Associate, the associate membership rebelled, and several of them wrote to the council saying that if this were not altered they would leave in a body. The council considered the question, and decided to form another class, that of Associate Member. Those associates who wished were all transferred to Associate Member. This has always worked harmoniously, and there has never been any question of opposition.

Mr. E. S. Gould.—Mr. President, I merely wish to ask the Professor if the student class in the Institution are allowed to discuss the papers written by Members?

Professor Bovey.—Any student at the meetings of the engineers can get up and discuss these papers, but, as a rule, they don't take advantage of this privilege.

Mr. Gould.—You spoke of students' meetings?

Professor Bovey.—The students' meetings are attended by the students. Papers are presented and discussed by these students. Sometimes two or three members of the council or members of the Institution sit upon the platform, and the whole proceedings are summed up by the presiding officer, who is generally a member of the council.

Mr. D. FitzGerald.—I have listened with a great deal of interest to the very admirable statement that has been made, but it seems to me that these organizations are not exactly similar, when the circumstances in our country are fully considered. I can well understand how the students in London may get great benefit from their association with the parent society, but we must take into account that here there are local societies which contain, practically, a large part of what would be the

student class. In these local societies they have the benefit of meeting and exchanging views, and of obtaining that intellectual food which it is supposed they would get from this Society if they were student members. The only further benefit that I can see is that they would receive our Transactions. But I do not think that we would care particularly to sow our publications broadcast over the country to men who are not with us as Members.

Professor BOVEY.—I think, Mr. President, that the cases are similar rather than different. We have a very large number of local societies in England, which do not conflict in the least with the parent society. There are local societies in Liverpool, Manchester, in fact in all the large cities. So far from conflicting with, I think they add to the standing of the mother institution. I was myself very intimately connected with the founding of the Liverpool society. There were several young fellows in Liverpool who could not always go up to London to attend the meetings of the Institution, and we thought it would be a very nice thing if we could form a society among ourselves; but never for a moment dreamed of lessening our connection with the mother society. Several of us met together and we formed what is now known as the Liverpool Society of Civil Engineers. I do not think that any local members are not members of the mother institution. I think that the formation of these local societies would not interfere with the benefits or advantages or workings of this Society. I think this great Society, and I presume the whole American profession represented by this Society, desire to promote the interests of the profession of engineering as much as possible.

Mr. CHARLES B. BRUSH.—I now formally offer the following amendment to the proposed amendments:

Resolved, That there be stricken out from the proposed amendments all those portions which refer to the creation of a grade of students.

This motion was seconded, and carried by a rising vote of 30 to 21.

Mr. THEODORE COOPER.—I consider that this amendment is not pertinent to the original proposed amendment.

Mr. J. J. R. CROES.—It seems only proper that this matter should be decided by the whole Society, and not by action taken at this meeting.

Mr. CHARLES B. BRUSH.—I did not have any intention of preventing an expression by the whole Society. If that is the result of the passage of my resolution I shall move to reconsider the vote.

The CHAIR.—If the resolution offered by Mr. Brush stands, then the Society at large will not have an opportunity to vote upon the question of establishing a student grade.

The motion to reconsider was put and declared carried.

The CHAIR.—The question now is upon the adoption of the amendment offered by Mr. Brush, as follows:

Resolved, That there be stricken out from the proposed amendments all those portions which relate to the creation of a grade of students.

Mr. THEODORE COOPER.—I make the point of order, that this amendment is not pertinent to the amendment as originally proposed, and is therefore not in order.

The CHAIR.—The chair decides that any amendment which neutralizes the amendment as originally proposed is not a pertinent amendment, and that therefore this amendment is not in order.

Mr. M. COHEN.—I would like to ask a question. As I understand it myself, we cannot strike out the enacting clause of the amendment, and it must come before the Society for ballot. If a resolution be in order that would call for the appointment of another committee to consider this subject and report to the Society in order that the advice and deliberations and suggestions which may be arrived at by that committee might accompany the form of letter-ballot, if that would be in order I would offer some such resolution. The reason for that is this: It appears to me that this meeting is scarcely prepared to indorse the suggestions of those amendments just as they now stand; they cannot be neutralized; and while it would appear that there are many arguments in their favor, still this particular time is not the most proper for carrying them out. Now, in allowing these amendments to go to ballot it might be well to have a committee appointed, which might bring out an intelligent vote from the Society, and would present the expressions brought out at this particular time. That is the object, and if it is proper, I will, as I say, offer some such resolution.

Mr. A. M. WELLINGTON.—I do not understand that there is any such power whatever. We can amend this at this meeting, but there is no possible opportunity for the appointing of another committee or for doing anything whatever except to amend these amendments at this meeting and send them out for vote. Constitutionally we can do nothing but amend these and send them out for vote.

A MEMBER.—Would it be proper to express, in connection with the letter-ballot, the sense of this meeting, where we have heard the various changes *pro* and *con* discussed; would it be improper to express that the sense of this meeting was against the addition of the student grade? Might the present meeting be regarded as a committee of the whole Society for considering the arguments *pro* and *con*, and that their judgment was against it?

Mr. COOPER.—These amendments must be recommended or disapproved at this meeting, that they may be sent out.

Mr. CROES.—Mr. Cooper is slightly in error in that respect. This meeting is not obliged to recommend an amendment in order to get it before the Society. "It shall be sent out with such amendments as may be adopted at the Annual Meeting." With regard to the other question raised this discussion will be printed and sent out before the ballot is taken, so that every one will have an opportunity to vote intelligently upon the subject, if he have any intelligence at all.

If the amendments in this form are not adopted, it can be revised in such form as this discussion and the further discussion upon it will lead to, in time for the next Annual Meeting. There is no such terrible hurry about this; it is hardly necessary to the life of the Society that this amendment should be adopted this year. Let us have a good square vote on this question; any five members can bring it up again next year and we can fight it all over again.

Mr. FitzGerald.—I don't desire to prolong this discussion, but I would like to ask if it is in order to pass the following resolution:

Resolved, That it is undesirable to amend the Constitution at the present time by adding the student class.

Gen. G. S. Greene.—I want to ask if it is in order to appeal from the decision of the Chair on this question that has just been decided as to the propriety of striking out all reference to students where it may occur in the amendments. It appears to me nothing is more clear than that to strike out these words is pertinent to this question, and that the ultimate view is to consider whether it is within the working of the Constitution.

The Chair.—It is entirely in order to appeal from the decision of the Chair. The question is, shall the decision of the Chair be sustained?

A resolution was offered striking out from the proposed amendments all reference to the student class. A point of order was made that such an amendment was not pertinent to the original amendment. The Chair ruled that such an amendment was not pertinent to the original amendment and was not in order, and the question now is, shall the decision of the Chair be sustained?

A vote was taken and the decision of the Chair was sustained.

Mr. FitzGerald.—I offered a resolution a moment ago:

Resolved, That it is the sense of this meeting that it is undesirable to amend the Constitution at the present time by adding a student class.

This resolution was seconded and carried.

Mr. E. S. Gould.—I offer another resolution:

That the sense of this meeting is against the change of title from Junior to Associate Member. That the sense of this meeting is that the term Junior be retained.

This motion was seconded and carried by a standing vote of 35 to 10.

Mr. J. P. Davis.—I do not see that that resolution affects the matter at all; this vote has no effect whatever.

Captain O. E. Michaelis.—I think that the motion which has been carried conveys to the members who have not been present to-day that the sense of the meeting is against the proposed change, and that is what they wish to be informed of.

The Secretary.—Mr. President, the amendments "A" upon the

circular have now been discussed by the Annual Meeting. Before passing to another amendment I would ask if there is anything further to be done with these amendments.

Mr. FITZGERALD.—I have offered an amendment which was merely postponed; that

Wherever in these amendments the words Associate Member is used it be stricken out and the word Junior be put in its place, and that the last clause of Article XVI be struck out.

This amendment was seconded and carried by a rising vote of 34 to 9.

It was, on motion,

Resolved, That Amendment marked *B* be submitted without amendment to the Society for ballot.

It was, on motion,

Resolved, That Amendment marked *C* be submitted without amendment to the Society for ballot.

The following resolution was offered:

Resolved, That it is the sense of this Annual Meeting that the amendment marked *D* should not be adopted.

This motion being seconded, was carried by a rising vote of 44 to 4.

It was, on motion,

Resolved, That the consideration of an amendment to the By-Laws which had been proposed should be postponed till the result of the letter-ballot on amendments to the Constitution should be known, as the amendment to the By-Laws was entirely contingent on the amendments to the Constitution.

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry was presented verbally by Mr. F. COLLINGWOOD, chairman of the Committee.

On motion, the report was accepted and the Committee continued.

Under the resolution previously adopted, Messrs. THEODORE COOPER, A. M. WELLINGTON, ROBERT MOORE, JOSEPH P. DAVIS and CHARLES B. BRUSH were appointed the Committee to put into proper form the amendments to the Constitution, making necessary verbal changes in accordance with the amendments as proposed and as amended by this meeting. The Committee to report at an adjourned meeting to be held Thursday evening.

Mr. R. HERING offered the following resolution:

Whereas, It is deemed highly desirable by the engineering profession that better information should be collected than is now available regarding the intensity of rainfalls in different sections of the United States, particularly with reference to the practical questions involved in the construction of works for water supply and sewerage; and

Whereas, It is entirely feasible for the Signal Service Bureau to obtain such information without increase of force, but simply by the erection of automatic self-registering rain gauges in addition to those now employed; therefore,

Be it Resolved, That the American Society of Civil Engineers respectfully urges upon Congress the desirability of inserting in the next annual

appropriation bill for the Signal Service Bureau an item sufficient to cover the expense of placing automatic rain gauges at all principal stations as the Chief Signal Officer may direct;

Resolved, further, That a committee of three be appointed to urge this matter upon Congress and the appropriate committee.

The resolution was seconded, discussed and adopted.

The following members were appointed the committee under the above resolution: Messrs. RUDOLPH HERING, DESMOND FITZGERALD and DAVID E. MCCOMB.

The Annual Meeting then took a recess till the evening of Thursday, January 19th, 1888.

JANUARY 19TH, 1888.—The session of the Annual Meeting was resumed at 20 o'clock. The committee appointed to put in shape for letter-ballot the proposed amendments to the Constitution reported those amendments as follows:

PROPOSED AMENDMENTS.

A. 1.—Amend Article XVI of the Constitution by substituting for the present Article the following:

Article XVI.

The active membership of this Society shall be divided into three classes, to be styled respectively Members, Juniors, and Associates; and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Juniors shall have all the rights and privileges of Members, excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and privileges of Members, excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

2.—Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A Member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age, who has been in active practice as such for at least ten years, or has graduated at a school of engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident or Superintending Engineer for at least two years, not as a skillful workman merely, but as one qualified to design, as well as to direct, engineering works.

A Junior shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a school of engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who

is a manager of a railroad, canal or other public work; a geologist, a chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit, qualifying him to co-operate with engineers in the advancement of professional knowledge, but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent engineer for not less than two years. A student may remain as such for seven years, or until attaining the age of twenty-seven years, when his connection with the Society shall cease, unless elected to a higher grade.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Applications for admission to any grade of the Society, whether by transfer or otherwise, shall contain a statement, over the candidate's signature, of his age, residence, nature and term of his professional service, and that he will conform to the requirements of membership if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept if elected.

Applications for admission as student must be endorsed by some one member or associate, and for admission to any other grade by at least five members, who certify in each case that they personally know the candidate, and that he is worthy of acceptance.

In case of transfer from one grade to another, the candidate shall be required to pay as entrance fee to the higher grade the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution, by substituting for the present Article the following:

Article XIX.

The election to the grade of student shall be by the Board of Direction, and one negative vote shall exclude.

The election for all other grades, after approval of the application by the Board, shall be by letter-ballot, which shall be canvassed at the next regular meeting held after twenty-five days have elapsed from the time of mailing the ballot lists. Five or more negative votes shall exclude. In case of the non-election of any candidate no notice thereof shall be taken in the proceedings or minutes.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been

tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall, in any event, be the only public announcement of the matter. A student may be summarily expelled at any time by a majority vote of the Board of Direction.

B.—Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" the following:

"Proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C.—Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

D.—Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX.

Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for no notice shall be taken thereof in the minutes.

The report of the committee was accepted, and it was directed that the amendments should be issued in the above form for letter-ballot.

The Annual Meeting then adjourned.

On the evening of Wednesday, January 18th, a paper on the Panama Canal in 1887 was read by Lieut. C. C. Rogers, U. S. N.

On Thursday, January 19th, a visit was made to the bridge in progress of construction over the Harlem Valley (two steel arches of 510 feet span each, and seven granite arches of 60 feet span each).

On Thursday evening a reception was given at the Society House.

The members of the Society, of the various classes, 176 in number, present at the annual meeting, excursions, etc., were: Charles Ackenheil,

John W. Bacon, William H. Baker, Frederick H. Baldwin, Arthur Beardsley, Leonard F. Beckwith, Henry A. Bentley, John A. Bensel, George H. Bishop, H. Bissell, John Bogart, Alfred P. Boller, William F. Booth, W. A. Brackenridge, Henry R. Bradbury, P. F. Brendlinger, Josiah A. Briggs, A. G. Brinckerhoff, Henry W. Brinckerhoff, Charles O. Brown, Charles B. Brush, Andrew Bryson, William H. Burr, Frank A. Calkins, Robert Cartwright, S. H. Chittenden, Benjamin S. Church, D. D. Clarke, Mendes Cohen, F. Collingwood, Alfred G. Compton, A. N. Connett, Theodore Cooper, George B. Cornell, E. L. Cottrell, Joseph P. Cotton, J. James R. Croes, Joseph P. Davis, J. Woodbridge Davis, George Devin, P. P. Dickinson, Thomas Doane, S. B. Downes, Thomas Egleston, Charles E. Emery, John T. Fanning, John W. Ferguson, George S. Field, Clarke Fisher, Desmond FitzGerald, J. Foster Flagg, John D. Fouquet, George B. Francis, James B. Francis, Arthur J. Frith, A. Fteley, Charles E. Goad, Henry H. Gladding, Edgar B. Gosling, Wilbur F. Goodrich, E. Sherman Gould, Charles H. Graham, Samuel M. Gray, George S. Greene, George S. Greene, Jr., Stephen S. Haight, William G. Hamilton, Charles M. Harris, Robert L. Harris, Bentley D. Hasell, William J. Haskins, Arthur Haviland, G. F. Haynes, Rudolph Hering, Albert B. Hill, S. Willett Hoag, Jr., John Houston, E. W. Howe, W. M. Hughes, C. W. Hunt, William R. Hutton, C. E. Jackson, S. J. Johnson, William P. Judson, George A. Just, Walter Katté, Thomas C. Keefer, Cassius W. Kelly, G. Leverich, Gustav Lindenthal, A. W. Locke, D. Jones Lucas, Albert Lucius, William W. Maclay, Edward E. Magovern, Henry Manley, James R. Maxwell, Thomas C. McCollom, David E. McComb, T. H. McKenzie, Mansfield Merriman, Henry C. Meyer, Thomas C. Meyer, O. E. Michaelis, J. Albert Monroe, Robert Moore, S. Fisher Morris, James Moylan, Charles H. Myers, O. F. Nichols, Willard A. Nichols, George B. Nicholson, Edward P. North, F. O. Norton, Albert F. Noyes, Fred. S. Odell, L. F. Olney, James Owen, A. B. Paine, William H. Paine, William Barclay Parsons, George H. Pegram, P. A. Peterson, Edward F. Playle, Arthur Pou, Robert J. Pratt, Samuel Rea, Benjamin Reece, George S. Rice, Palmer C. Ricketts, Percival Roberts, Jr., William Roberts, G. M. Rusling, J. Gardner Sanderson, John S. Schaeffer, C. C. Schneider, Henry B. Seaman, Granville W. Shaw, William P. Shinn, Frank W. Skinner, A. W. Smith, Miller A. Smith, Oberlin Smith, T. Guilford Smith, J. Parker Snow, Julio F. Sorzano, John H. Staats, Waterman Stone, W. A. Sweet, George H. Thomson, John Thomson, George C. Tingley, Calvin Tomkins, E. E. Russell Tratman, Alfred W. Trotter, Edgar B. Van Winkle, Downing Vaux, Yoshichika Wada, Lebbeus B. Ward, James R. Wardlaw, Albert L. Webster, A. M. Wellington, N. J. Welton, W. C. Wetherill, E. B. Weston, Thomas D. Whistler, W. Howard White, O. F. Whitford, Frank W. Whitlock, Frank O. Whitney, D. J. Whittemore, William H. Wiley, Joseph M. Wilson, Sebastien Wimmer, William E. Worthen, A. J. Zabriskie.

OF THE BOARD OF DIRECTION.

JANUARY 4TH, 1888.—Applications were considered. The report of the sub-committee on Professional Training and Technical Education was presented. Arrangements for the Annual Meeting were considered. Appropriations were made.

JANUARY 11TH, 1888.—The Secretary presented final draft of the Annual Report, which was considered, amended and adopted.

JANUARY 19TH, 1888.—In accordance with the provisions of the Constitution, the following Standing Committees were appointed :

On Finance, Messrs. Stevenson Towle, Charles B. Brush and Mendes Cohen.

On Library, Messrs. J. James R. Croes, A. Fteley and Joseph M. Wilson.

REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31ST, 1887.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1888.

The Board of Direction, in compliance with the provisions of the Society law, presents its report for the year ending December 31st, 1887:

MEMBERSHIP.

As shown by the tabular statement hereinafter given, there has been, during the year, an addition of 116 to the various grades of Society membership. In this nominal addition of 116, there are two former Associates transferred to Members, and nine former Juniors, also transferred to Members; therefore the actual new additions to the Society membership during the year number 105.

The losses from the Society membership have been 14, being 11 by death and 3 by resignation. The number of persons now connected with the Society is 1 110, being greater by 91 than at the end of the previous year.

The actual net increase during the year, and present total in each class of membership, are:

Honorary Members, decrease during year.....	1	Total....	8
Corresponding Members.....		.....	3
Members, increase during year.....	78	Total....	838
Associates, " "	1	"	45
Juniors, " "	14	"	120
			1 014
Fellows, not included above, decrease	1	Total....	56
Subscribers to the Building Fund, not included above		"	40
Increase during year.....	91	Total....	1 110

Tables showing the classification of membership at the beginning of the year, and the changes during the year, are given at a subsequent part of this report.

Annual Convention.

The Annual Convention was held at the Hotel Kaaterskill, Catskill Mountains, N. Y., July 2d, 4th, 6th and 7th, 1887.

The proceedings at the Convention have been published in detail in the proceedings for that month. Members of the Society assembled at the rooms on the evening of the 30th of June, and on the next morning, July 1st, proceeded by steamer up the Hudson River to Rondout, and thence, by rail, to the hotel. There was a large attendance at the Convention. A number of interesting papers were presented, and the discussions both on technical subjects, and at the business meeting, were animated. During the Convention visits were made to the bridge in progress of erection over the Hudson River at Poughkeepsie, and to the cement mines and works at Binnewater, Ulster County, N. Y.

The suggestions made by Members as to a desirable place for the next Convention, and an invitation which has been tendered to the Society, will be presented at the present meeting for your consideration.

Meetings of the Society.

Nineteen meetings of the Society were held during the year, one of which was the Annual Meeting, held in New York, January 19th and 20th, and another the Annual Convention, held at the Hotel Kaaterskill, New York, July 2d, 4th, 6th and 7th, all the sessions of the Convention, including the business meeting, being counted as one meeting of the Society. Meetings have been held on the first and third Wednesdays of each month, except July and August.

Thirteen meetings of the Board of Direction have been held during the year.

Light collations, provided entirely by subscription of Resident Members, have followed the Society meetings, and have given opportunities for conversation which have been appreciated.

Transactions.

The number of pages issued in the Transactions is now increasing to such an extent that it has been determined to make the volumes include six months, instead of twelve, as heretofore. This will make the Transactions much more easily bound and handled, as the 1 035 pages of last year were found to be too bulky for convenient reference and use.

The Society House and Building Fund.

At an informal meeting held at the Hotel Kaaterskill on July 4th, 1887, at which a number of members of the Society were present, the President, Mr. William E. Worthen, stated that the Society had grown to such an extent that the present house had become inadequate, particularly for the meetings, and for the convenient use of the library, and

that it was of great importance to the welfare of the Society that something should be done either towards building an addition to the present house, or, if it were practicable, the purchase of larger and more commodious quarters.

The following resolutions were adopted :

Whereas, The accommodation of the present Society building is entirely inadequate for the purposes of the Society, and it is deemed advisable without delay either to provide new quarters or an enlargement of the present building;

Resolved, That the members and friends of the Society are urged to contribute to the Building Fund as they may be able in order that immediate measures may be taken by the Board to accomplish this object.

Resolved, That the Board, in its discretion, may expend a reasonable sum in an addition to the present building.

The sum of $5 225 was directly subscribed by gentlemen present; and subsequent subscriptions have been received, making the total amount $9 169.50.

The Board of Direction, in view of the extent of this subscription, and of the fact that it exceeded the amount estimated as necessary to make an enlargement of the present house, determined to appoint a committee with reference to ascertaining whether an amount could not be secured from among persons connected with engineering interests to warrant the purchase or erection of a larger building for the Society.

Subject of the Appointment of a Committee on Technical Education and Professional Training.

At the last Convention of the Society the following resolution was adopted :

Resolved, That the Board of Direction of the Society be requested to consider the advisability of appointing a standing committee on Technical Education and Professional Training, which should annually report to the Society the status and progress of such instruction in the United States, and Europe as well, together with such data, statistics and suggestions relative to the subject as may seem to them proper; said committee to co-operate with similar committees of other engineering societies, should such be appointed.

In discussing the proposition thus submitted to the Board, it is necessary to consider the aims and objects of the Society, and the proper scope of investigations which may be undertaken under its direction and at its expense.

Out of the infinite variety of subjects which interest civil engineers, it is evident that only a limited number can be critically examined and discussed by, and at the expense of this organization, which includes specialists in almost every branch of the profession. It appears to the Board that in selecting topics for discussion and papers for printing,

preference should be given to subjects which will be of interest and profit to engineers who have had such experience and made such advances in their profession that they are qualified to criticise methods of overcoming difficulties and solving novel points of practice.

Whatever the ultimate scope of the Society's work may be, it must always be borne in mind that the object of its formation and the aim of its present existence is not primary education in science, but the higher education of skilled scientists.

As its funds available for the dissemination of scientific knowledge increase, opportunity will be afforded for extension of the scope of its publications, so as to include, possibly, the consideration of the best methods of primary education.

But at this time primary or rudimentary education is not its object, and will not be so long as it remains devoted to the objects and aims of its founders and, we believe, the great majority of its present members.

The Board does not consider it advisable, therefore, to take any action which would lead to the expenditure of the Society's funds in discussing the early education of engineers so long prior to the time when they can, under any circumstances, become members of the Society.

Amendments to the Constitution.

No amendments to the Constitution have been adopted during the year.

A number of amendments have been regularly presented and are before you for discussion and amendment at the present Annual Meeting.

The Norman Medal.

The Norman Medal for the year 1886 was awarded to Paper No. 318, "English and American Railroads Compared," by Edward Bates Dorsey, M. Am. Soc. C. E.

The Board of Censors to award this medal for the past year will present its report at the present meeting.

The Rowland Prize.

The Rowland Prize for the year 1886 was awarded to Paper No. 317, "The Cantilever Bridge at Niagara Falls," by C. C. Schneider, M. Am. Soc. C. E.

The Committee to award this prize for the past year will present its report at the present meeting.

Membership Tables.

The following tables show the changes and additions during the year in the various classes of membership:

On January 1st, 1887, the date in the last report, the membership in the Society was :

Honorary Members, resident ...	3	Non-resident	6	Total ...	9		
Corresponding Members	—	"	3	" ...	3		
Members, resident	153	"	607	"	760		
Associates, "	11	"	33	"	44		
Juniors, "	25	"	81	"	106		
	—		—			—	910
Making, resident	192	Non-resident	730			—	
Total							922
Fellows, 64, of whom 7 Members are included above, leaving							57
Subscribers to the Building Fund, 140, of whom 90 are entered in one or other of the above classes, and 10 deceased, leaving							40
Total connected with the Society, January 1st, 1887 ..							1 019

At the present date, January 1st, 1888, the membership is:

Honorary Members, resident ..	3	Non-resident	5	Total ...	8		
Corresponding Members	—	"	3	" ...	3		
Members, resident	168	"	670	"	838		
Associates, "	11	"	34	"	45		
Juniors, "	29	"	91	"	120		
	—		—			—	1 003
Making, resident	211	Non-resident	803			—	
Total							1 014
Fellows 62, of whom 6 Members are included above, leaving							56
Subscribers to the Building Fund, 140, of whom 89 are entered in one or other of the above classes, and 11 deceased, leaving							40
Total connected with the Society, January 1, 1888							1 110

The additions during the past year to the several classes of Society membership have been :

Members qualified	86
Members reinstated	1
Associates qualified	3
Juniors qualified	25
Fellows qualified	1
Total additions	116

The decrease during the year in the several classes of membership has been :

Honorary Members	Died	1		1
Members	"	6	Resigned 3	9
Associates			Transferred to Member	2
Juniors	Died	2	" " 9	11
Fellows	"	2		2
Totals: Deaths 11, Resignations 3, Transferred 11				25

There has been an addition of 116 to the various classes of membership, and a decrease of 25, making the actual net additions during the year 91 in number.

On January 1st, 1887, there was, as stated in the last Annual Report, 29 proposals pending. One hundred and seventy-six proposals have been received during the year; 87 candidates have been elected Members, of whom 2 were transferred from Associate, and 8 were transferred from Juniors; 3 candidates have been elected as Associates; 28 candidates have been elected Juniors; 1 candidate has been elected a Fellow.

Eighty-six persons have during the year qualified as Members; 3 have qualified as Associates; 25 have qualified as Juniors; 1 has qualified as Fellow; 7 candidates elected during the year as Members, and 4 as Juniors have not qualified. There are 56 proposals now pending.

The Library has been increased during the year by the following additions:

Books and Pamphlets	526
Maps, Plans, Drawings, Charts, Photographs and Engravings	136

The Society has lost, by death, during the term covered by this report, six Members: Messrs. JAMES B. EADS, Past Vice-President, and who was also a Fellow of the Society and a Subscriber to the Building Fund; F. W. VAUGHAN, Past Director of the Society; WILLIAM W. WILSON, EUGENE F. FALCONNET, SULLIVAN HASLETT, STEWART DERBISHIRE; 2 Juniors: Messrs. A. J. STAHLBERG and FRANK BERESFORD; 2 Fellows: Messrs. FREDERICK KRUPP and ALEXANDER MITCHELL.

Respectfully submitted,

For the Board of Direction,

JOHN BOGART, *Secretary.*

REPORT OF THE TREASURER FOR THE YEAR ENDING DECEMBER 31st, 1887.

RECEIPTS.

Balance on hand December 31st, 1886:				
Building Fund			$100 00	
General Funds			3 838 02	
				$3 938 02
Entrance Fees			$2 875 00	
Current Dues:				
From 102 Resident Members	$2 432 50			
" 506 Non-resident Members	7 292 26			
" 7 Resident Associates	97 50			
" 16 Non-resident Associates	160 00			
" 14 Resident Juniors	195 00			
" 67 Non-resident Juniors	625 00			
		$10 802 26		
Past Dues:				
From 12 Resident Members	$317 50			
" 38 Non-resident Members	667 50			
" 1 Resident Associate	30 00			
" 2 Non-resident Associates	30 00			
" 3 Non-resident Juniors	25 00			
		1 070 00		
Dues for year beginning January 1st, 1888:				
From 23 Resident Members	575 00			
" 41 Non-resident Members	615 11			
" 3 Non-resident Associates	30 00			
" 2 Resident Juniors	30 00			
" 4 Non-resident Juniors	40 00			
		1 290 11		
			13 162 37	
From sales of Publications	.....		780 07	
" Certificates of Membership	.....		126 00	
" Advertisements	.....		429 75	
" Interest on Fellowship Fund Bonds	$480 00			
" " Savings Bank Deposit	19 30			
" " Norman Medal Fund	70 00			
" " Rowland Prize Fund	60 00			
" " General Fund Stock	40 00			
" " General Fund Bonds	60 00			
" " Compounding Fund Bonds	60 00			
			789 30	
From Fellowship Fees	.....		150 00	
Subscriptions to Fund for Enlarged Building	.....		6 169 50	
Compounding Payments	.....		500 00	
Other sources	.....		4 30	
				24 986 29
				$28 924 31

DISBURSEMENTS.

Interest on Mortgage	$800.00	
Taxes	471.15	
Publications	8 069.30	
Stationery and Printing	970.90	
Postage	1 355.43	
Library	797.37	
Salaries	3 000.00	
Convention and Annual Meeting	1 597.95	
Janitor, House Supplies, Fuel, Water and Gas	1 867.78	
Certificates of Membership	58.25	
Insurance	244.63	
Norman Medal and Rowland Prize	120.50	
Finance—Treasurer's Books, General Accounts—Collections	1 100.00	
Work on Committees	370.00	
From Building Fund—Permanent Repairs	100.00	
Other Expenditures	441.23	
		$21 364.49
Purchase of Bond, Building Fund		1 035.00
		$22 399.49
Transferred to Savings Bank		19.30
Balance on hand:		
Building Fund	$5 134.50	
General Funds	1 371.02	
		6 505.52
		$28 924.31

The funds of the Society are as follows:

Fellowship Fund:	
Ninety-one subscriptions to December 31, 1886.....	$9 800.00
Premium and accumulated interest December 31, 1886	1 388.28
Fund on hand December 31, 1886.....	$11 188.28
One subscription during 1887.....	150.00
Interest received during 1887.....	534.87
	$11 873.15
Expended for publications during 1887.....	534.87
	$11 338.28
The present investment of the Fund is:	
Nine Pennsylvania Railroad General Mortgage Six per cent. Bonds, cost.....	$11 111.82
Portion of deposit in Seamen's Bank for Savings.....	226.46
	$11 338.28
Norman Medal Fund:	
One Certificate Croton Aqueduct Stock, New York City.....	$1 000.00
Building Fund:	
Receipts previous to December 31, 1885.....	$17 842.00
Expended:	
For Legal Services, Circulars, etc.....	355.03
For Improvements on Property.....	3 486.97
Payments on Purchase.....	14 000.00
	$17 842.00
Fund for Enlarged Building:	
Receipts.....	$6 169.50
This fund comprises:	
Cash.....	$5 134.50
One Chicago and Northwestern Railroad 5 per cent. Bond, cost.....	1 035.00
	$6 169.50

Rowland Prize Fund:	
One Pennsylvania Railroad General Mortgage Six per cent. Bond, cost	$1 222.50
General Investment:	
Ten Shares Stock Consolidated Gas Company of New York, cost	$972.50
Portion of one Pennsylvania Railroad General Mortgage Six per cent. Bond	222.50
Portion of deposit in Seamen's Bank of Savings	758.10
	$1 953.10
Compounding Fund:	
Four single payments for compounding dues	$1 000.00
The present investment of this Fund is:	
Portion of one Pennsylvania Railroad Six per cent. General Mortgage Bond	$1 000.00

Respectfully submitted,

G. S. GREENE, Jr.,
Treasurer.

REPORT OF THE COMMITTEE ON FINANCE.

NEW YORK, January 17th, 1888.

The Finance Committee have the honor to report that they have performed the usual duty of auditing all the bills which have been paid by the Treasurer during the past year, and have found that each bill has been charged to its proper fund, and that the several sums have not exceeded the amounts appropriated by the Board of Direction for the purposes specifically mentioned. Also that the Committee has, at the end of the year, carefully examined all the assets of the Society, and has found that the reports of the Secretary and Treasurer give a correct account of the same.

WILLIAM G. HAMILTON,
Acting for Finance Committee.

REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1888.

The Special Committee on Uniform Standard Time have the honor to report that there has been a steady if not marked progress in the time reform movement during the past year.

At the last Annual Meeting it was announced that the 24-hour notation had been introduced for use on the Western and Pacific Divisions of the Canadian Pacific Railway, embracing with branches and connections, 2 600 miles. In January last the new notation had been in practical use for over six months and the Vice-President of the company had placed at the service of the Committee a large number of letters received by him from the principal officers, from the Lieutenant-Governor of Manitoba, from the Mayors of cities and others, all testifying to the advantages resulting from the change. These various documents, together with the report of this Committee, were printed in pamphlet form and sent to members of the General Time Convention for their information. A Special Committee of that association at the same time issued a circular drawing attention to the pamphlet and submitted a series of questions to which they invited replies.

The General Time Convention met on the 13th of April last in New York, when the replies received were reported and of which the following is a

SUMMARY.

QUESTION No. 1.—Are you in favor of the general adoption of the 24 o'clock system of counting the hours—abandoning the use of A.M. and P.M. ?

REPLIES.—Affirmative—	61	railways.....	35 645 miles.
Negative—	38	"	26 572 "
	99		62 217 "

QUESTION No. 2.—Are you willing to adopt this system for use on your employees time-table, provided your connecting lines will do the same ?

REPLIES.—Affirmative—	76	railways.....	47 004 miles,
Negative—	21	"	20 109 "
	97		67 113

QUESTION No. 3.—Do you consider it necessary that you should be assured that the people along the line of your road will adopt the 24 o'clock system (so you can use it for advertising your time) before you will be willing to adopt it for your employees time-tables?

REPLIES.—Affirmative—37 railways.....22 529 miles.
Negative— 49 " .....26 110 "
86 48 639 "

QUESTION No. 4.—Do you believe the people, generally, in your vicinity, will readily adopt the system if it is adopted by the railway companies?

REPLIES.—Affirmative—25 railways.....11 436 miles.
Negative— 49 " .....34 594 "
74 46 030

QUESTION No. 5.—Do you believe it to be practicable to bring about the change at the present time?

REPLIES.—Affirmative—38 railways.....25 435 miles.
Negative— 44 " .....33 843 "
82 59 278 "

This expression of opinion from so practical a body is of great value. It shows that they are nearly equally divided with respect to an immediate change, those of the negative opinion slightly preponderating. The replies to Question No. 2 are the most important and encouraging. They establish very clearly that from 78 to 79 per cent. (of all the railways heard from) are willing to adopt the 24-hour notation for use in the operating of the roads, provided the connecting lines will do the same.

During the past year the new notation has been continued on the Canadian Pacific Railway with assured favor, and the company is so well satisfied with the advantages of the system that they intend extending it as soon as it can be conveniently done. Since mid-summer last it has been employed on the line owned and operated by the Canadian government from the City of Quebec to Halifax, in Nova Scotia. Mr. C. Schreiber, the manager of that line, has placed at the service of the Committee a number of letters respecting the working of the new system, from which a few extracts may be submitted for the information of the Society. These extracts may be taken as samples of the opinions of intelligent practical railway-men who have had the best opportunities of judging:

Chief Train Despatcher G. M. Jarvis writes from Moncton, December 13th, 1887: "I consider it far in advance of the old system of time notation. For despatchers it is a great deal better and safer in every way. I have not heard a train-man speak but in the most favorable terms of it."

Station Master R. Macdonald writes from Halifax, December 12th:

"The 24-hour system is a decided improvement, preventing confusion in reading time-tables and schedules of train records."

Conductor W. Kelly writes from St. John, December 10th: "I believe it is the best for time-tables and registering trains, as train men are not so liable to make mistakes as by the old system."

District Superintendent A. R. McDonald writes from Riviere du Loup, December 19th: "The simplification of the expression of time is a decided improvement, and not only in the time-table but in numberless minor affairs the new system has its advantages."

Chief Train Despatcher T. Crockett writes from Riviere du Loup: "In the despatching department this system is invaluable. For working and time orders the time cannot be misconstrued. Since its adoption on the Intercolonial I have not heard of a mistake being made with regard to time; the old excuse of 'I took it for morning instead of evening,' is entirely set aside."

Chief Superintendent D. Pottinger writes from Moncton, January 4th, 1888: I consider that the new system is a decided improvement on the old practice of dividing the day into A. M. and P. M. hours, as it is much simpler, and in the running of trains it removes a cause of danger that exists under the old system of ever mistaking an A. M. hour for a P. M. hour, either in the time-table or in train orders. In this way it is a benefit to the public, as it promotes their safety when traveling."

"I have made frequent inquiries when traveling over the line and find that the majority of employees on all parts of the road are pleased with it, and like it better than the old notation. The newspapers, when it was first introduced on the railway, in general spoke in favor of it, and I have seen no adverse comments on it since. The public, however, are slow in adopting it, but that is to be expected, as it is one of those changes which, while it commends itself to the reason, interferes with a long established custom."

These expressions of opinion are similar to those referred to by the Committee in the report submitted at the last Annual Meeting. They establish that wherever the new notation has been tried, it has proved to be equally advantageous to the railways and to the public. It is quite true that in sections of the country long settled and occupied by people with confirmed habits, the change is not so readily accepted by the public as in newer, more progressive and possibly more intelligent communities. But that the people in all localities will accept the change eventually, especially if the railroads take the initiative, there can be no doubt.

By the replies to Question No. 3, issued to members of the General Time Association, a majority of those heard from do not think it necessary, before adopting the new notation on the railways, to be assured that the people will accept it. They may be warranted in this opinion

by the readiness with which the Standard Time system was accepted generally, when it was adopted by the railways four years ago. There are others who consider it advisable to take means gradually to prepare the public mind for the change.

With the latter object in view, the American Meteorological Society and the Canadian Institute (two societies which have for years ably co-operated with this Society in advancing the movement of Time reform) are about to appeal to the Chief Superintendents of Education in the United States and Canada, to bring the whole question of Time and its Notation before the public schools. By such means the youth of both sexes throughout the several States and Provinces between the Atlantic and Pacific will receive new and correct ideas on this subject, and it is believed that in a very few years the public mind will effectually be influenced to accept readily any desirable change which the general welfare may demand.

In referring to the progress in Time reform made during the past year, the Committee may mention the fact that on January 1st, 1888, the 24-hour notation was in use for railway purposes in the Provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Assiniboin, Atherton and British Columbia.

In other parts of the world the Time reform movement is making substantial progress. In Great Britain, in Sweden and throughout the Japanese Empire, the time in common use is in complete harmony with the Standard Time which we have throughout the United States and Canada. Hence it may be affirmed that the new system of time-reckoning is now introduced for public use in the three continents of America, Europe and Asia.

SANDFORD FLEMING,
Chairman of Special Committee.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BOLTON, CHANNING MOORE	Chief Engineer Richmond and Danville R.R.; President and Manager Richmond City (Va.) Ry. 1,300 Penn ave., Washington, D. C.	Jan. 4, 1888
D'INVILLIERS, CAMILE STANISLAUS	Philipsburg, Centre Co., Pa.,	Jan. 4, 1888
DUNLAP, DE CLERMONT	296 Warren ave., Chicago, Ill.	Jan. 4, 1888

GLADDING, HENRY HOLBROOK....(Elected Junior, July 1, 1885). 30 Stanley st., New Haven, Conn ..... Jan. 4, 1888

HAVILAND, ARTHUR.....(Elected Junior, Jan. 4, 1882) 591 East One Hundred and Thirty-fifth st., New York City Jan. 4, 1888

LEDLIE, CHARLES HEES.....417 Olive st., St. Louis, Mo... Jan. 4, 1888

NEWHAM, CHARLES EDWARD. ...(Care Special Water Commission). Albany, N. Y..... Dec. 7, 1887

PATTEN, HENRY BENJAMIN.....Division Engineer, Union Pacific Ry., Cheyenne, Wyo ... Jan. 4, 1888

RICKON, FREDERIC JOHN HENRY...Engineer City Electric St. Ry., Little Rock, Ark..... Jan. 4, 1888

STEWART, JOHN MUIRHEAD.....(Elected Junior, March 2,1887). P. O. Box 87, Dobb's Ferry, N. Y ..... Jan. 4, 1888

WRIGHT, GEORGE FRANCIS.....City Surveyor, Santa Barbara, Cal ..... Jan. 4, 1888

JUNIORS.

ADAMS, JULIUS LE ROY.....155 Congress st., Brooklyn, N. Y..... Jan. 4, 1888

BAINBRIDGE, FRANCIS HENRY.....Wilmington, Del..... Jan. 4, 1888

CARROLL, EUGENE.....(Care Trustees Covington Reservoir). Covington, Ky..... Jan. 4, 1888

HILDRETH, RUSSELL WADSWORTH.Inspector for Messrs. Morison and Corthell, Athens, Pa.... Jan. 4, 1888

KASTL, ALEXANDER EDWARD.....Assistant to Division Engineer Chicago, Santa Fe and California Ry., Chillicothe, Ill... Jan. 4, 1888

LYDON, WILLIAM ANTHONY.....Assistant Engineer Chicago Lake Tunnel, foot of Peck Court, Chicago, Ill..... Jan. 4, 1888

POTTER, ALEXANDER.....City Engineer's office, Kansas City, Mo..... Jan. 4, 1888

DEATHS.

AINSLIE, GEORGE.....Elected Fellow May 28th, 1872; died Sept. 7th, 1878.

FISHER, CHARLES H.....Elected Member July 7th, 1869; died Jan. 18th, 1888.

MERCUR, FREDERICK.....Elected Member July 20th, 1870; died Jan. 10th, 1888.

TRAFTON, GILMAN.....Elected Member Jan. 4th, 1871; died May 25th, 1887.

This advance proof of a portion of January's Proceedings, with the discussion and action at the Annual Meeting on the proposed Amendments to the Constitution, is issued to Members at the same time as the form for letter-ballots for those Amendments.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—January, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

The Annual Meeting of the Society.

January 18th, 19th, 1888.—The meeting was called to order at 10.30 o'clock, President William E. Worthen in the chair; John Bogart, Secretary.

It was, on motion, ordered that the ballot for officers of the Society should be declared closed at noon. Messrs. Charles W. Hunt, Arthur Haviland and Edgar B. Gosling were appointed Tellers to canvass this ballot.

The Annual Report of the Board of Direction* was read by the Secretary, and, on motion, accepted.

The Annual Report of the Treasurer* was read by the Treasurer, and, on motion, accepted.

The Report of the Finance Committee* was read, and, on motion, accepted.

* Printed separately, following these minutes.

The following statement of suggestions made by members of the Society as to the place for the next Convention was read:

Milwaukee was suggested by 155; White Sulphur Springs by 6; San Francisco by 5; Old Point Comfort by 5; Atlanta, Ga., by 5; Pittsburgh, Pa., by 4; Chicago, Ill., by 4; Cleveland, O., by 4; Lake George, St. Paul, Minneapolis, Anniston, Ala., Omaha, Newport, R. I., and New York, each by 2; Atlantic City, Boston, Chatauqua Lake, Cresson, Deer Park, Duluth, Hartford, Kansas City, Lookout Mountain, Louisville, Mackinaw, Marquette, Montreal, Narragansett Pier, Niagara, Philadelphia, Providence, St. John, N. B., Saratoga, Hotel at Stow, Vt., Syracuse, Washington, D. C., and White Mountains, each by 1; that we accept no invitation from any place, but go on our own responsibility, by 2.

A communication was also presented, signed by all the members resident at Milwaukee, Wis., and by the Mayor of that City, requesting the Society to favorably consider the propriety of holding the Convention at Milwaukee.

On motion, the City of Milwaukee, Wisconsin, was designated as the location for the next Convention. The determination of the time for the Convention was referred to the Board of Direction with power.

The discussion of the proposed amendments to the Constitution was made the special order for noon.

The report of the special standing Committee on Uniform Standard Time* was presented and read, and, on motion, accepted, and the Committee continued.

The Special Standing Committee to consider a plan for creating a Library for joint use presented the following report, which was read:

To the American Society of Civil Engineers:

I beg to report on behalf of the "Committee to consider a plan for creating a Library for joint use," that no satisfactory progress has been made in the matter, and that while my conviction remains as heretofore that such a joint library should be created, I am unable to give sufficient encouragement in the matter to warrant me in asking for a continuance of the Committee.

Respectfully submitted on behalf of the Committee.

WILLIAM P. SHINN,
Chairman.

On motion the report was accepted and the Committee discharged.

The report of the Committee to consider the proper relation to each other of the Sections of Railway Wheels and Rails being called for,

Mr. A. M. WELLINGTON, member of the Committee, said:

Mr. President, Mr. H. Stanley Goodwin, the Chairman of the Committee has requested me to report that at the time of the last Convention at the Kaaterskill, the Committee had under consideration a very large mass of matter. It was arranged that I should put that matter into shape and draft a rough form of report. At that time we expected to have finished our duties and to present a report at this meeting; but

* Printed separately, following these minutes.

since that time I have lost two months by sickness, and in addition have had a large increase of work of another nature to occupy my attention. I expected to have been able to straighten out the various documents, which have still further increased since the time of the Convention, but I think that I can promise this report for the next Convention.

We ask that the Committee be continued, and in place of Mr. Morison, who has gone abroad, that authority be given to fill his place in the Committee.

On motion, the Committee was continued and the President and Board of Direction were authorized to fill the vacancy occasioned by the absence of Mr. Morison in Europe.

The subject of the existing ambiguity of engineering titles was presented by letter by Messrs. JOHN A. FULTON, M. Am. Soc. C. E., and C. D. PURDON, M. Am. Soc. C. E.

Mr. JOHN A. FULTON (by letter): An old engineer, not a member of the Society, has requested me to call the attention of members to two very ambiguous terms always enco ntered in railroad construction.

They are "Division Engineer" and "Resident Engineer." If the matter could be discussed at the Society meeting and an agreement arrived at as to which, in the Society's opinion, should be regarded as the higher of the two; and then a circular letter addressed to the various General Managers and Chief Engineers throughout the country, with a request that they adopt its suggestion, some uniformity in the meaning of each of these terms could be arrived at, and annoying mistakes avoided. I trust that some one will take enough interest in this matter to bring it before the Society.

Mr. C. D. PURDON (by letter): Would it be proper to ask the Society to define the use of the names Assistant, Division and Resident Engineers? On some roads in the Southwest the Resident Engineer comes next below the Chief, then Assistant, then Division; on others the Resident Engineer is the lowest grade, so that it is impossible, without personal knowledge, to know the exact status of a man who applies for a position and says he has filled one of these positions.

Even if it would not be correct for the Society to make a rule in the matter, their recommendation would do a great deal in making the names of position uniform.

The subject was discussed by Messrs. D. J. Whittemore, A. M. Wellington, John Bogart, J. J. R. Croes, E. L. Corthell and A. Fteley.

On motion it was resolved, That a committee be appointed by the President to formulate recommendations with reference to the Grades and Titles of Engineers on Public Works and to report at a future date.

Subsequently the President announced the appointment of the following members of the Society as such committee: Messrs. D. J. WHITTEMORE, ALBERT A. ROBINSON and JAMES L. RANDOLPH.

The hour of noon having arrived, the ballot was declared closed.

The consideration of the proposed Amendments to the Constitution, having been made the special order for this hour, was then entered upon.

The following amendments as regularly submitted and as previously sent to all members, were then read:

A. 1. Amend Article XVI of the Constitution by substituting for the present Article the following:

CONSTITUTION.—*Article XVI.*

The active members of the Society shall be divided into three classes to be styled respectively Members, Associate Members and Associates, and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Associate Members shall have all the rights and privileges of Members excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and privileges of Members excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

Members of the Class previously styled Juniors, shall after March 7th, 1888, be classed as Associate Members.

2. Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age, who has been in active practice as such for at least ten years, or has graduated at a School of Engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident, or Superintending Engineer for at least two years, not as a skillful workman merely, but as one qualified to design as well as to direct engineering works.

An Associate Member shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a School of Engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who is a manager of a railroad, canal or other public work; a geologist, chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit; qualifying him to co-operate with engineers in the advancement of professional knowledge; but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an Engineer, and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent Engineer

for not less than two years. A Student shall not remain in that grade for more than seven years; if not elected to a higher grade his connection with the Society shall terminate at the end of seven years, or upon his attaining the age of twenty-seven years.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Nominations and proposals for admission to the Society, except to the grade of Student, shall be endorsed by at least five members, who certify that they personally know the nominee or candidate, and that he is worthy of acceptance. The proposal for Member, Associate Member, or Associate, shall contain a statement, over the candidate's signature, of his age, residence, the nature and term of his professional service, and that he will conform to the requirements of membership, if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept, if elected. Nominations for Students shall be made out as for other grades, but the endorsement may be signed by a Member, Associate Member, or Associate, and but one such signature will be required. Such nominations shall follow the usual course of procedure for other grades except submission to a letter-ballot; the Board of Direction shall elect or reject the applicant.

A proposal for transfer from one class to a higher shall be made by at least five members, and shall state the age of the candidate, and the nature and term of his professional service since his admission to the Society. Such statement shall show a degree of qualification sufficient to render the proposed eligible to election in the class to which transfer is asked. Upon the approval of the Board of Direction, the candidate shall be balloted for, as provided in the election of members; and when the transfer is made, he shall be required to pay as an additional entrance fee the amount of the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XIX.

In elections for membership of either class, Members shall vote by letter, or by ballot in the usual way, and the result shall be announced at the next regular meeting held after twenty-five days have elapsed from the time of mailing the notification. Five or more ballots cast in the negative shall exclude. Members notified but not responding shall be classed as having voted in the affirmative. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

In the election of students by the Board of Direction, one negative vote shall exclude the applicant.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more Members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and

present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the Member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall in any event be the only public announcement of the matter. A Student may be summarily expelled by a majority vote of the Board of Direction at any time.

B.—Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" at the end of the first clause of the Article the following:

"But the proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C.—Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, and requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open ballot, and five or more ballots cast in the negative shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall not be less than 25 days after the Secretary has issued the notice above mentioned."

D.—Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX—Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

The President stated that under the provisions of the Constitution these proposed amendments were now in order for discussion, and that they could be amended in any manner pertinent to the original amendments by a majority vote at this meeting.

The amendments were then discussed.

Mr. J. J. R. Croes.—As any material changes would necessarily interfere with the main idea of these proposed amendments and prevent the Society, as a body, voting upon the main question at issue, certain members who had proposed to offer amendments to these have decided to withdraw any proposition for changes, and ask simply that the amendments, as proposed by the committee, go out for letter-ballot to the Society as they stand, with such discussion as may be had at this meeting, so that all members may fully understand the subjects at issue.

The ground of opposition to the proposed changes in the Constitution is stated succinctly in the circular which was sent out to the members recently, and is as follows: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association."

It was also suggested to enlarge the definition of the term Civil Engineer, because it really includes all branches of engineering work. Also it was suggested that the full period of study at a preparatory school should not be considered as equivalent to the same period of actual practice in the profession.

The gentlemen present can, of course, express their views on the subject very fully. There are some members who are not able to be present, whose views have been sent, and should be read before the meeting and go out as part of the discussion. I will therefore read these communications.

Mr. M. J. Butler (by letter).—I desire to put myself on record as a supporter of those who are seeking to establish a student grade of membership in the Society. I am a member of two engineering societies wherein student grades exist, and I have yet to learn of any objections to them. The great success of the Institution of Civil Engineers of England is largely due to its student grade. The smaller success of the Canadian Society of Civil Engineers is due, not to the students, but to the youthfulness of the society itself.

I take exception, however, to the low grade of qualification called for in a student member.

A student should be a young man not less than 18 years of age nor more than 25; he should have gone through three years of the technical school or have had at least two years' practical experience and study under a practicing civil engineer, and his election should depend on the statement furnished as to his preliminary educational acquirements. A student should be nominated by a Member or Associate Member. An Associate who is not a civil engineer should not have the nominating of any member of this Society.

Mr. ROBERT E. MCMATH (by letter).—I do not think that the creation of the proposed student grade would be a departure from the declared policy of the Society. It is no more than pursuing one step further what was begun when the class of Juniors was established. To the proposition of the committee which drafted the amendments, that there is not room for a student grade below the present Junior, there seems to be no dissent. To the other proposition, that room be made by advancing the standard of qualification for all grades, there is, so far as I know, no serious opposition. But it seems there are those who are not willing that the room so made shall be occupied.

A circular issued by a number of influential and honored members of the Society says: "This Society is not an institution for primary education, but is intended to be an association of skilled and experienced engineers for mutual improvement by the interchange of ideas and experiences of a character more advanced than can be fully understood by novices in professional work. Admission to any grade of membership should be contingent on experience had and work accomplished, and not on the mere desire to learn and the hope of future benefit by association." This is a definition of the objects of the Society that is certainly not consistent with Article II of the Constitution, and, as I understand it, not consistent with the claim made for the Society of being national, or rather continental, in its scope. If the statement quoted is intended to hinge upon the word primary, then it is not pertinent to the subject before us, for no one proposes that the character or style of papers and discussions be changed, unless for the better. The clause in Article II of the Constitution, placing "the professional improvement of its members" as first in the objects of the Society, is meaningless unless a leading object is education. The only question is the age and relative standing of the classes. The proposition pending defines the age and standing of three classes, which might be styled Senior, Intermediate and Preparatory. I assume that we all wish to be learners to the end of our lives. Again, Article II makes "the advancement of engineering in its several branches" the third object. This is meaningless if the work of the Society does not look to the future, not for days only, but years. How can it better look to and care for the future of the profession than by affording facilities and opportunities to those who will be the profession in coming years? To create the proposed grade is to go forward; to reject the proposition is to go backward, for to stand still in an active age is impossible.

The idea of an association of skilled and experienced engineers exchanging ideas and experiences for mutual improvement is much narrower than I am willing to believe is entertained by any considerable number of members; but it is in the line of the, to me, objectionable policy which now withholds our Transactions from sale, and practically forbids republication of papers.

Members will please observe that, practically, the only privilege the student will use is that of owning the Transactions; they can read them now in libraries. It is not possible that any considerable number can avail themselves of the right to use the library and rooms and to attend meetings. Nor may we expect that many papers by student authors will pass beyond the hands of the Library Committee under Section 16 of By-Laws. Hence the inability of novices to understand advanced ideas will not be offensively shown in the presence of their elders. Were it otherwise, I am inclined to think that it would often be a good thing for the elder to see how quickly an idea will be grasped by the novice, and how promptly he will detect the fallacies even of experienced and skillful engineers.

Refering to the last clause of the quotation from the circular, I request attention to the fact that the proposed amendments nowhere speak of students as a grade of membership. Membership begins with the grade of Associate. Students are received without much formality, and may be dismissed with less.

The amendments may certainly be divided into two propositions. First, increased experience and age in all classes; second, the creation of the preparatory grade. To such a division I make no objection, provided that both are submitted to the Society for letter ballot.

Concerning the proposed substitute form of Article XVII, I would remark that the Committee considered the advisability of enumerating the branches of engineering, and decided not to do so, for the very good reason that the branches are not themselves defined. As an illustration, let the "city" engineer find in the proposed substitute the designation under which he would come if his specialty has been street grades and pavements.

To the proposed change from seven years to eight in qualification of graduate Members, and from two to three of graduate Associate Members, I have no objection; rather the contrary.

Also the striking out of the occupations of Associates is a change for the better. In fact, there are many clauses of the existing Constitution which could be improved in style. But your Committee adhered to its instructions, and proposed only necessary changes, rendered so by the proposed new grade.

Mr. Carl Gayler (by letter).—The Commitee appointed to consider the advisability of adding a student's grade to the Society state in their report that the only objection raised against the new grade is the danger of lowering the standard of the Society; but it seems to me that there are two other objections important enough to be taken into consideration, namely, the influence of a membership in the American Society of Civil Engineers, even in a lower grade, on the young student, and the distinction in favor of the student, implied in this membership, between him and a young man who is not lucky enough to enjoy a regular professional education.

A student may, generally speaking, be designated as a young man whose parents had the means and good sense to send him to a higher school; he has been more fortunate in that respect than other boys of his age, presumably equally gifted and ambitious as himself. This is all; there is no merit on his part, and it is adding insult to injury to tell the young man who has not had these advantages, "that there is little excuse for any young man who would enter the profession without the advantage of a technical education."

We also know, and we know it partly from experience with ourselves, that the trouble with the student and graduate is his exalted opinion in regard to his own usefulness in life. It is true, actual life will, sooner or later, rub off some of this very pleasant opinion; but it is certainly not desirable to foster and increase the same, as would, in my opinion, be done through the establishment of this new grade.

Taking the case of two young men, one of them either at some high technical school, or under the tuition of some competent engineer, the other without means, working perhaps for his daily subsistence in some shop, with no other tools for his success but such as his own energy and perseverance will furnish him; we invite the former, under the amended Constitution, to a grade in our society, whilst the other sees, in the race for success, a new distinction made between himself and his more favored competitor.

We have to keep in mind that the best men, as a rule, are not those who had the greatest advantages for learning in their youth; and that it is generally the hard battle of life which forms the successful man. By smoothing the path of the student, by adding to his conceit, in a word, by taking a step in the direction of making the career of the civil engineer from the school up to the chief engineer analogous to that of the West Pointer or of the Government Engineer in Europe, we deviate from the way in which engineering in this country has attained its high standard. The Society does not gain; the student is liable, in my judgment, to lose as much in force of character as he may gain in knowledge, and the young man who works his way up in our profession, without the adadvantage of a college education, is placed at an additional disadvantage.

I, for one, am opposed to the amendment as far as it relates to a student's grade.

C. S. Masten (by letter).—I agree with the suggestion to strike out from the proposed amendments the clause creating a student grade.

Mr. Edward S. Philbrick (by letter).—As I shall not be able to be present at the Annual Meeting of the Society on the 18th, I wish to express through you my disapproval of the proposed amendment of the Constitution establishing the grade of students, for the following reasons, viz.:

The class of young men for whose benefit this change is proposed are already fully supplied with all the reading matter which they can well

digest through the technical schools and public libraries within their access.

I think, therefore, that the probable encumbrance of this new class of members in the use of the Society's library and rooms, and the introduction of crude matter into papers and written discussions from this new source, would be much greater than would be justified by the probable advantages to the young men themselves.

I have for many years been acting on the Board of Government of the Massachusetts Institute of Technology, one of the best technical schools in our country, and it is well known to all its faculty that young men who are about to enter professional life are too apt to grapple with questions beyond their depth, and expect, with sanguine hopes, to solve in a few months many questions which have defied the acumen of past generations of scientific men. In short, such men are always "biting off more than they can chew."

The present status of this class of young men among us is far more favored in regard to resources for acquiring professional lore than in any other age or country with which we are familiar. What they need most is not mere reading matter and discussion, but practical work. They will learn more that is of real use to themselves at that age by joining a field party in Arizona, or even by stoking a locomotive for a few months, than by digging in our library for a year.

That library is of great value to the working engineer, the man who has to meet new questions in physics or constructive work, and who must qualify himself to grapple with them by the experience of others in the same field. Such questions can never be foreseen by the student. If he attempts to study them all, he will have to spend his whole life in the library. He may then become a walking encyclopedia, but not an engineer. I should therefore favor the proposed amendment to the amendment.

Mr. A. Gottlieb (by letter).—I agree with the proposition to strike out of the amendment the creation of a student grade. I do not agree with other points in the circular, lengthening the time of previous practice, as I think that the important point is not the number of years, but the actual responsible charge of work.

Mr. Amory Coffin (by letter).—I heartily approve the objections to the proposed student's grade.

Mr. D. M. Greene (by letter).—I am in favor of striking out the proposed new grade of student.

Mr. James L. Randolph (by letter).—I approve the idea of striking out the provision for a student grade. I think the requirements for Associate open the doors wide enough. To me the student grade seems like setting up an opposition to the Engineering News, Railroad Gazette, etc., and to schools.

Mr. Wm. Pierson Judson (by letter).—I fully agree with views ex-

pressed in the circular dated January 5th, 1888, regarding the proposed amendments to Articles XVI and XVII of the Constitution.

Even if there is a demand, which I doubt, for the suggested Kindergarten Annex, the Society cannot make the change without lowering its standing.

In Article XVII, also, your form of amendment is much to be preferred for the same reason.

Mr. CLEMENS HERSCHEL (by letter).—The matter referred to in the circular has been quite fully discussed, and I will only say that I am glad this stand has been taken, the sentiments of which will, I trust, prevail in the society.

Capt. O. E. MICHAELIS (by letter).—I cordially approve the amendments offered in the circular.

Mr. JOHN A. FULTON (by letter).—Concerning the proposed grade of "Student of the Society," it appears to me that having become such a student the enterprising young man will be likely to mention as a part of his credentials, and truthfully too, that he "belongs" to the Am. Soc. C. E.

The person to whom he applies for work will ordinarily know nothing whatever of the various grades of membership, and will be very apt to think that an engineering society that would admit as members persons having only "youth and inexperience to recommend them," cannot be entitled to any great amount of respect.

It seems as if the adoption of such a measure would have a tendency to injure the Society's present standing without having the virtue of benefiting the "Student of the Society," who, however, well meaning in his intentions, will appear to the average public as something of an impostor.

I am in favor of the amendment to the amendment of Article XVI, and am in favor of the amendment to the amendment of Article XVII.

Mr. LEWIS KINGMAN (by letter).—I think it to the interest of the Society that the amendment proposed to strike out that portion in reference to students and amend the rest of the Article as the circular suggests, should be carried, and I will vote for those amendments.

Mr. JOHN A. WILSON (by letter).—As to the matter of students, and the definition of the term Civil Engineer, I fully concur in the views expressed in the circular.

The proposition to create a grade of students in the Society, probably is based on the existence of a student grade in the Institution of Civil Engineers of England. An examination of the constitution of that institution shows that to make a man eligible as a student he must be a pupil of a corporate member of the institution. In this country the circumstances are entirely different, and we have no system of apprenticeship or of articled students in engineering offices. The English institution does not throw its doors open to all indiscriminately who fancy

that they would like to become engineers, and I see no good reason why our Society should do so. The way in which the subordinate positions on engineering work are manned in this country makes it almost impossible to discriminate or to establish any definite rule by which admissions to a student grade could be regulated, and the practical result of establishing such a grade would be to flood the Society with an element that would not only be objectionable but a positive nuisance.

I do not, however, agree with the proposed change in the name of that grade which now is classed as Juniors, and would suggest that the name Junior Member be adopted. Is it not a mistake to have a grade of Associate Members and also a grade of Associates? It seems to me that the term Associate Member is a misnomer. As proposed in your amendments an Associate is not a Civil Engineer, and therefore cannot become a member; but an "Associate" or Junior Member, being a Civil Engineer, can become a full member. The class which you now propose to call Associate Members are in reality Junior Members, both in fact and by definition. I would therefore suggest that your amendment be further amended by changing the name Associate Members to Junior Members.

The other points in the amendments more clearly define the status of the various grades in the Society, and avoid much of the ambiguity which now exists as to where applicants for admission to the Society should be classed. With the exception which I have made I am decidedly in favor of the amendments as you propose to make them.

Mr. JOSEPH M. WILSON, Mr. CHARLES G. DARRACH, Mr. HENRY W. WILSON, and Mr. HENRY B. SEAMAN (by letter).—We concur in the views expressed in the foregoing letter of Mr. John A. Wilson on the subject of amendments to the Constitution.

Mr. J. S. SEWALL (by letter).—I think the proposed amendments to Acticles XVI and XVII of the Constitution ought to be amended by striking out the sections creating and defining the grade of students. I also approve the other verbal amendments to the proposed Article XVII as printed in your circular dated January 5th, 1888.

Mr. H. W. CLARKE (by letter).—The term Civil Engineer is certainly broad enough to cover all classes who are now eligible to election as Member. Eligibility is, I think, much better defined in the amendment as proposed in the circular than in the original article.

With so many well equipped scientific schools in the country, I do not see the necessity of formally establishing a student grade. I think there is nothing in the present Constitution or By-Laws which totally debars a bright young man, studying in the office of a member, from referring to books in the library when the privilege may be asked by his chief. And I think our meetings are not so secret but that any reputable Non-member, introduced by a Member, may attend them.

Mr. HENRY N. BABCOCK (by letter).—I was surprised at the way in which the Convention last summer (which I could not attend) was carried away with the idea of infant baptism, so to speak, attempting to supervise the education of prospective engineers and to receive them into the Society before they have decided what their occupation is to be. It is a sort of missionary work proper enough for the colleges and their professors, but seems outside the purpose of a Society of Engineers.

Mr. JAMES G. DAGRON (by letter).—I am heartily in favor of the proposed raising of the standard for admission to the different grades of membership. The Society should, above all, aim at quality and not quantity, so that it may truly become the representative body of American engineering, to be elected a member of which should be the highest honor that could be rendered an engineer by his peers.

I am opposed to the proposed grade of student, for the reason that while many young men study engineering and think they are called to the profession, on the other hand, but few are chosen; for many find on entering practical life, that their inclinations and aptitudes lead them in other directions. Therefore it would seem unwise to give them any connection with the Society until they have shown by a continuance of actual practice in engineering, that they will persevere in the profession. The grade of student in the Institution of Civil Engineers answers to a want which cannot well be said to obtain in this country. In England, young men desirous of entering the profession, do not, as a rule, attend special schools, nor pursue special studies, but enter the office of a practicing engineer, where they become veritable apprentices; after some years of this practical training, they start out for themselves as full-fledged engineers. In this country, on the contrary, theoretical education in one or another of the many Engineering Schools now extant, is obtained before entering upon practical life. This custom is becoming the rule instead of the exception, and although the standard of many of the Engineering Schools could stand judicious raising, the time is coming when it will be fully recognized that any young man who enters the profession without preliminary theoretical training will do so considerably handicapped in the race for professional advancement.

I believe that in France and Germany, where preliminary theoretical education is the rule and not the exception, none of the professional societies have ever felt the need of or created a grade of student. I fail to see wherein such a grade would add to the standing of the Society, and if a lower grade than the proposed one of Associate Member is needed, why not retain the present grade of Junior with its present requirements, which are surely low enough.

I believe that the full period of study at an Engineering School should not be considered as equivalent to the same length of time spent in actual practice of the profession.

On the grounds above stated, I am in favor of the proposed amendment to Articles 16 and 17 of the Constitution, as proposed by the circular.

The proposed amendment D to Article XIX is, I think, a step in the wrong direction. It would seem to me to be unwise, impolitic and unsafe to place the election to membership in the hands of a majority of the Board of Direction, which might become a close corporation and wield its power to the detriment of the Society's best interests. With the elections to membership controlled by the membership at large as at present and a strict Board of Directors to closely scrutinize applications, it would seem that it would be more difficult for unfit candidates to secure elections, as in most cases they are known to members other than their five proposers, and these latter in case of known unfitness have thus a chance to communicate their knowledge to the Board of Direction for action. Any injustice that might be done to a candidate through prejudicial black-balling would be offset by the proposed amendment C to Article XIX if adopted.

Gen. W. S. Rosecrans (by letter).—I think the proposed amendment to Article XVI of our Constitution objectionable. We ought not to create the grade of student. In my judgment, the effect of it would be to lower instead of to elevate the dignity of memberships, which ought to be sought and attained only by solid experience and thorough work.

For this reason, wherever the clauses concerning students occur in the proposed amendments to the Constitution, they should be stricken out.

For the proposed amendment to Article XVII, I prefer that suggested by the circular.

Mr. D. Farrand Henry (by letter).—Certainly, I agree with the circular. If members want their children educated—which, I presume, is the true inwardness of this move—there are plenty of places where they can be sent without making a "district school" of the Society.

I should say, let the children of members have use of the library when in the city, but before they can become connected with the Society, let them be engineers in something beyond "intent." Civil Engineer is a generic term and should be retained.

The other points are good and consequential.

Mr. George Y. Wisner (by letter)—I fully agree in the objections to the proposed amendment to the Consttiution, that the Society is not intended to be an institute for primary education, and besides, I fail to see how the proposed student grade can accomplish even that purpose outside of the few who may join in New York City.

Mr. Fred. Brooks (by letter).—I think fairness requires that the Society should have the opportunity of voting by letter-ballot on the question of establishing a grade of students. The annual meeting may determine what particular conditions of admission of students shall be

the subject of the letter-ballot; it may recommend that any amendments to the Constitution proposed for establishing a grade of students be not adopted; but it ought not to cut off from submission to letter-ballot some such proposed amendments. A motion to that end might, in my judgment, be ruled out of order as impertinent.

Col. J. W. ADAMS (by letter).—The objections to creating this grade of students are so tersely and happily expressed in the circular, that nothing which I could say would add one particle to its force.

There are those who are ready to write pages of weak argument in favor of that grade being introduced. I have read some of it, and I know the writers as advocates for bringing the entire body of self-styled engineers in the United States, if possible, into the American Society of Civil Engineers, on the ground that numbers alone confer strength, thus lowering the standard of the Society in the public eye (for the dollars they bring), to that of a mere "Union" of workers in the same business, where individual qualifications may be what they may.

I read this morning as an argument for the new grade, "Who can, in cold blood, object to the granting of such limited privileges as these (alluding to the student grade) to every qualified and vouched-for applicant, who wants them and is willing to pay for them." The "wanting and willing to pay" was not considered as a valid argument even for selling our Transactions in open market, still less should it be for selling our good name.

And another "in the Institution of Civil Engineers, they (the students) are nearly as large in number as the grade of member." How long, I would ask, would it be, here, before some such advertisement as this would appear:

"Mr. ——— is open to an engagement as engineer to any company about to undertake public improvements. Late a student in the American Society of Civil Engineers. Terms moderate."

There are scores of educational asylums throughout our country ready to confer the degree of full-fledged Civil Engineer on its graduates. Is our Society equipped for going into competition with these, and manufacturing engineers at a much cheaper outlay?

No—my advice would be, to open your doors to no one (aspiring to engineering honors) of any grade, unless he brought with him something of professional experience and reputation to add to the common stock.

Mr. A. M. WELLINGTON.—Since Colonel Adams has seen fit to specifically refer to certain statements written by me and published in *Engineering News* of January 14, 1888, I must request the republication of the part of the article to which he more directly refers, in order that members may judge for themselves how fair and how well founded is the interpretation which he has seen fit to put upon one or two expressions; premising only that for a person to enter the student or any other

grade in this or any other Society he must have the four qualifications enumerated below, viz.: (1) He must be properly qualified; (2) he must be properly vouched for; (3) he must want the privileges of the Society; (4) he must be willing to pay for them. The following is the extract referred to:

"Is it, or is it not, the view of a majority of the Society that 'the mere desire to learn and the hope of future benefit by association,' combined as it must be of necessity with good moral character and standing and a certain minimum of study or experience, is an insufficient qualification for admission to any grade of the Society, either actual or potential? To the vast majority of the Society such a question will almost answer itself. If the 'mere' 'desire to learn and hope of future benefit' are not a sufficient qualification for the limited privileges which it is proposed to grant to these 'novices in professional work,' what are sufficient grounds for such gracious favors? What are these privileges? They may be all listed thus: (1) To pay $6 to $10 per year; (2) to receive the printed publications of the Society; (3) to present papers and written (not oral) discussions, which if deemed worthy will be printed, and if not will be waste-basketed; (4) to have their names and addresses printed, in the Society lists in a separate roll; (5) to use the library and rooms of the Society to the extent and in the manner which the Board of Direction approve of from time to time; (6) to attend (not take part in) certain of its meetings subject to the same provisions, until such time shall come that the Board thinks it better to provide for special meetings of students, as in England, and to exclude them altogether from the regular meetings. Even these privileges no one can obtain if a single member of the Board of Direction objects, and he holds them only during the will of the majority of that Board or until attaining the age of twenty-seven years, when they cease abruptly and he is dropped from the rolls of the Society, unless he has previously been elected to one of the permanent grades.

"Surely he must have a somewhat dog-in-the-mangerish disposition who can in cold blood—and realizing what he is doing—object to the granting of such limited privileges as these to every properly qualified and vouched-for applicant who wants them and is willing to pay for them. If it will in fact make the society 'an institution for primary education,' or for any other kind of education, which it is not now, so much the better. The gentlemen who issue the circular boldly assert that that is not a purpose of the Society, but unless it can be shown that it will not tend to 'the advancement of engineering in its several branches,' or will do more than corresponding damage to the other work of the Society, we are compelled to differ from them. To assert that it will do such damage, as for instance tend to 'dilute' the Society, is indeed possible, but only by ignoring plain facts. On the contrary, a chief merit of the proposed measure is that it will make it possible to maintain what is not now maintained, a really high standard for admission to the higher grades.

The ' dilution ' comes in in attempting to crowd all grades of experience into one or two grades, as the only alternative to excluding altogether; and it has had, and will continue to have, unless corrected, a very injurious effect upon the standard for full membership."

As statements in various of the letters which have been read seem to be based on a misapprehension of facts, I desire to add further that the requirements for the admission of students to the Institution of Civil Engineers are much lower than those fixed in these amendments, being thus set forth in the form of proposal: " That he is upwards of eighteen years of age and is under twenty-five years of age; and is, or has been, *bona fide*, in the course of preparation and training under me with the object of becoming engaged in the design or in the construction of such works as are comprised within the profession of a civil engineer, as defined by the charter." I am informed that a very large and rapidly increasing proportion of those who enter as students, do so as undergraduates, or very recent graduates, of the numerous engineering colleges in England; such as Kings College; Owens College, Manchester; Liverpool College; Edinboro School of Engineering; Glasgow University; University of Cambridge (which has a fine school of engineering connected with it); Chatham Military School, and others. As soon as a young man enters any of these colleges he is eligible as a student of the Institution if over eighteen, and I am informed that many so enter. As it will hardly be claimed that the Institution of Civil Engineers is engaged in " primary education " in any objectionable sense, the objections raised to this measure on that score, which seem to be the principal solid basis of objection, fall to the ground.

Mr. M. COHEN.—Mr. President, it seems to me that this matter resolves itself simply to this: what is the benefit to the American Society of Civil Engineers from the adoption of these amendments? There may possibly be another question that we all propose to answer, somewhat different from the first, and that is, whether the ultimate benefit to the American Society of Civil Engineers will be sufficient to warrant the immediate benefit to somebody else. The benefit to the Society can only be from the sale of some of its Transactions and Proceedings to the new student. Even supposing that we may be greatly benefited by the papers which these young men may be capable of producing and reading before us, there would not probably be a great many of these, so that all we would gain would be the sale of our Transactions. Now, what would be the benefit to future members? We will introduce here a number of young men as students who will attend the meetings of the Society, and will use, to some extent, its library. These young men will, in exchange for a moderate fee, have these facilities and receive the Transactions.

They may be benefited, it is true. Would they not receive precisely the same benefit by receiving the Transactions only? I think they

would. The facilities of the library here could only be used by resident students; those residing in the City of New York. And where are there students of civil engineering in the City of New York? Our American Society is not the Institution of Civil Engineers; they are entirely different. We have no student apprentices. The students are the scholars of the various technical schools in the city and its neighborhood; they may be benefited; they can come down here to these meetings of the American Society of Civil Engineers, and after the meetings—they can go somewhere else, if they desire. And what is the ultimate benefit to us? I say, nothing. The mass of our students of engineering throughout the country are scattered over the broad land. They cannot get any benefit except from the receipt of the Transactions; the only benefit to them is their receipt, for a small consideration, of our Transactions.

There is another view of that branch of the subject. The local schools then could recommend to the parent the great facilities that his son would enjoy by his proximity to the Society of Civil Engineers; that he had only first to attend the school and then could be readily admitted to associate with these gentlemen, and you can readily see the benefits to be derived thereby by these schools. It helps the schools in the neighborhood, but I don't see that it helps the Society. It seems to me that all that is desired by those who advocate this measure can be reached without interfering with the Constitution.

Mr. William H. Paine.—I would like to say, as one of the Committee upon that amendment by which students could be admitted to this Society, that I did not attend the Convention. I was myself personally opposed to the whole scheme, but as it seemed the sense of the Convention at the time that Committee was appointed, to have the student grade added to the other grades, it remained the duty of that Committee, that some way should be arranged, and such alterations of the Constitution should be made as was necessary, and that those alterations should be considered and brought forward by that Committee. We have, with all due diligence, labored to make that arrangement of the Constitution which will permit this adding of the new grade; yet, on the question of whether the student grade be adopted or not, I shall vote to the contrary, although a member of that Committee.

Mr. Theodore Cooper.—Mr. President, at the Convention I took the stand of opposition to the admission of students, and I think my opposition has been fully indorsed by the committee who arranged the proposed amendments; they acknowledge what I claimed that there was no room at the bottom in this Society, but that there was room at the top. They have raised the standard for all grades of membership in the Society. As the amendment now stands, there is no objection to it—even with the student grade in it, as they now put it. Now, I desire to retreat from all further opposition, and I indorse the proposed amendment for the reason that there are no students to come into this Society. There is

no demand by young men or boys; we might have a dozen students at the end of the year, but they will probably withdraw at the end of the next year. The American boy is not willing to acknowledge his inferiority to the President of the Society. You cannot get at the young man who wants to join the Society in this way; he will not come in as a student; he will wait till he can come in some other grade. In fact, take the young men who are almost old enough to come in as Members, as the case is now; they say, "We don't want to enter the Society as Juniors; we will wait a year longer and become Members." At the Convention one of our able engineers mentioned that he had under his employ forty young men who had been under his employ in the great aqueduct waiting to come into the Society as students; that they were waiting for this amendment to come in as students. I think they are waiting to come in as members.

I don't believe there is any demand at all for such a thing; therefore I say there is no harm in having this amendment passed; it will only cost a few extra lines of printing in our Constitution. But taking this whole matter as it stands, it is excellent; it is raising the grade of our membership, and I would rather see the whole amendment passed as it stands to-day than lose all by wiping out the student grade. But in the discussion of the student grade and of the amendments to the Constitution, we have got to be very careful to see that they do not conflict with many other things. After this discussion I hope some gentleman will move that the whole subject be referred to a committee, so that we can get it in good shape. There are matters of composition, and there are one or two very vital points to be considered. For instance, at the end of the first clause—"Members of the class previously styled Juniors shall, after March 7th, 1888, be classed as Associate Members." I object to that. Ought not the men who are now Juniors come into the Society the same as any other member and be classed according to their qualifications? Why should we pass them along? I am not reflecting on any one; I am not reflecting on any member of the Junior class, but if they are worthy let us pass them, and if unworthy let us sift them out. I may mention one case of a man who has been a Junior for nearly fifteen years. Now, are we going to pass that man without an examination? I say they should be tested to know whether they are qualified. Having done that, I have no objection to the amendment as now presented.

Mr. ROBERT MOORE.—Mr. President, what is the question?

The PRESIDENT.—Under the Constitution, these amendments are open for discussion.

Mr. MOORE.—Is there a vote to be taken on them?

The PRESIDENT.—There is a vote to be taken upon them by letter-ballot, as they now are, if not amended; if amended, as amended. The vote is to be taken by letter-ballot of the whole Society.

Mr. CROES.—Any amendments pertinent to the original resolution may be made at this meeting; if approved by the Annual Meeting, the amendment in that shape goes out, and only in that shape; there is no alternative ballot; there is an absolute ballot on the amendment as now perfected. This is to give an opportunity for any alterations of the amendments which may be found necessary by the Annual Meeting. If there are any amendments to be made pertinent to the character of the whole amendment, they can be made here.

Mr. E. P. NORTH.—Is it impossible, Mr. President, to vote on this amendment in parts; can it be presented in two different sections? That is, to take what is generally regarded as an improvement, the raising the standard of Members and Associates as one question, and the question as to the admission of the student grade as another? I believe there is no objection to raising the standard; the only question is in regard to the admission of students. Can this amendment be put out in two sections, so that a man can vote on one and not on the other?

The PRESIDENT.—As I understand it, this amendment has to be voted upon as a whole, not in parts.

A MEMBER.—We could not strike out one part of that amendment and have it amended as pertinent to the original amendment; that would be very impertinent. We must vote for it as it stands; we surely cannot strike out one part of it and have it remain pertinent.

Mr. CROES.—That is precisely why the proposed amendment to the amendments was withdrawn.

Mr. T. C. KEEFER.—I think there has been some misapprehension in regard to what is a student in the English Institution. That studentship is not confined to apprentices and articled clerks; it is open to students in the engineering classes in any of the colleges of the Empire. We have in Montreal, in the engineering class in McGill College, students of the Institution of Civil Engineers.

Mr. ROBERT MOORE.—Mr. President, as one of the committee which presented these resolutions, I may perhaps explain somewhat the position of the committee. As we understood our duties in the matter, it was to formulate amendments to the Constitution which should admit the grade of students, whether we personally favored that grade or not. We understood that the meeting at the Kaaterskill had been, on the whole, favorable to the admission of the student grade in some form; the question then arose as to the form in which such a grade should be admitted. In canvassing the matter, it seemed to us very clear that there was no room for the admission of this grade, except by advancing all the other grades. The only thing we could do was either to raise the standard of all the grades or to declare that we could not formulate any proper method by which the student grade could be admitted. It required changes in the Constitution advancing the grades of membership, and introducing the additional grade of Associate Member, and so making the grades

of membership correspond to the grades of the Institution of Civil Engineers. After a great deal of conversation and reflection we concluded to make the recommendation as it stands now. Provided, and only provided, that the other grades of membership were advanced, we would recommend that the grade of students be admitted, and I think that the committee were unanimous in feeling that, unless the whole amendment could go together, we were opposed to the admission of the grade at all. There were some other points on which the committee were not unanimous. The terms of the amendment as proposed were not satisfactory altogether to the committee, and without some further amendment I think that the members of the committee would not be sorry to see the whole proposition defeated. I refer particularly to the matter of associate membership. To some of us it seemed of very doubtful propriety to admit a second grade of membership to be called Associate Member. It seemed of doubtful propriety, unless we could postpone the admission of a person to membership until they had reached maturity of years, until they had had practical experience sufficient to show what they were made of, so that we found we were all agreed in postponing the time of admission to membership until the age of thirty, increasing the requirements as to experience, and also providing a grade of Associate Members of young men of less experience; but, as the amendment now stands, a man might be an Associate Member for life, and on that there was a divergence of opinion in the committee, and a further amendment to these articles was drawn up by Mr. McMath, one of the members of the committee.

But I would personally prefer to see this proposed amendment made still more sweeping. I would like to propose a further amendment to Article XVII, that the connection with the Society of Associate Members who are not transferred to the grade of Member or Associate (in which latter grade a man need not be a civil engineer at all), ten years after admission to associate membership, shall cease. The idea is that, unless they are transferred to membership at the end of ten years, they shall cease to be members at all.

Mr. CROES.—Is Mr. Moore ready to offer such an amendment now?

Mr. MOORE.—Yes, sir.

Mr. CROES.—We want to have a definite proposition before us. I intended to move that the amendment be sent out without amendment. You move to amend?

Mr. MOORE.—Yes, sir.

Mr. E. S. GOULD.—Mr. President, I wish to say that I am very much opposed to the creation of the student grade. So much has been said against the creation of this grade, and my own views have been so much better expressed by other members than I could have done, that I could perhaps only say what has already been said. But I will say that I am, myself, very much opposed to the creation of such a grade. I think it

would be a mutual disadvantage instead of a mutual benefit. As every point almost has been gone over thoroughly and well, I would simply say that it seems to me the only advantage to the Society from this grade would be the fees which it might add to the treasury; and as to the students themselves, I entirely coincide with the views already expressed, that they would derive a very slight benefit from such a limited association as this. There has been a great deal said in excuse of the creation of such a grade, that the young men would not avail themselves of it, and that they would be very generally gotten rid of, and that would be one reason why there would be very little harm in their admission; but, under those circumstances, there would be very little reason for the creation of such a grade, and I shall certainly vote against the proposed amendment.

The SECRETARY.—Mr. President, Professor Burr, Member of the Society, has forwarded the following discussion on this subject:

Mr. WILLIAM H. BURR (by letter).—The propriety of this amendment rests primarily on the scope of the Constitution, for if the objects of the Society, as set forth in that instrument, do not permit the formation of such a grade as that of "students," it is idle to discuss the feasibility or advisability of its creation. Article II of the Constitution reads as follows:

"Its objects shall be: The professional improvement of its members, the encouragement of social intercourse among men of practical science, the advancement of engineering in its several branches, and the establishment of a central point of reference and union for its members."

Now, it may be a matter of opinion just how much "intercourse among men of practical science" is to be encouraged by embracing in the list of the Society's members young men eighteen to twenty-seven years of age; but as "men of practical science" must pass the years included between these limits, it is difficult to imagine why intercourse among them to some extent would not be encouraged in the contemplated grade, except the Society lack capacity for such encouragement, or unless the man of science begins to be practical only at the age of twenty-seven or at some later period. But probably no one would admit either of these alternatives. Few are the engineers who do not begin their practical career at or before the age of twenty-one, and it is not difficult to find engineering students who use a considerable percentage of their time in practice at the age of eighteen.

Nor, I believe, can it be fairly denied that the proposed grade would advance engineering in its several branches, which the Constitution states as the third object of the Society. Any action by which young men who are preparing, or have prepared themselves to practice engineering in its several branches are brought in agreeable contact with older members of their chosen profession, will tend to give them a peculiar equipment for their duties which they could scarcely otherwise

acquire. The growth of technical ideas will be more healthy, a better judgment will be developed and a stronger common sense, besides that finish and cultivation of the individual which contact with mature professional men is sure to confer on those of less experience. Such benefits enjoyed by those who are and are becoming engineers cannot fail to materially improve the quality of their work in after life when they reach positions of responsibility. Now, these same students will almost invariably become either members or associates; and let it be remembered that whatever improves the members of the Society vastly improves the Society itself. It would thus receive through a properly created grade of students constantly increasing benefits. A high professional tone or character in its individual members will enhance, in a multiplied degree, the position and influence of the Society as a body, and no means shall be neglected to accomplish so desirable a result, so long as it is within the proper scope of the Constitution.

We are told that the Society is not an institution for primary education, which is unquestionably true, but has no proper bearing on the proposed amendment. If it is meant that the Society should divest itself of everything of an educational character, there will be little left worth saving. Of all the educational influences or forces valued and encouraged by the Society, that of experience is the greatest. When a man ceases to learn or be educated in the broad sense of the word, he ceases to live; from that time on he simply exists, exhausting his accumulated capital of experience and soon becoming a mental bankrupt in the activities of life.

Again we are told that the Society is an association of "skilled and experienced engineers," although the Constitution makes no such statement and has for many years provided for a class of young professional men whose experience and years are not sufficient to entitle them to the rights and privileges of full membership. Any such narrow and trade-like restriction savors altogether too strongly of the trade union to form a basis of action of a society of professional men. Broad principles, generous motives and high aims should characterize every feature of such an organization, and the statement derives emphasis from the success of the strongest engineering organization in existence at the present day.

The fact that young men would enter the grade of student with the desire to learn and the hope of benefit by association, is to my mind not only an argument for its existence, but a positive demand for its creation. If the Society could recruit its members from a body of young men actuated by an earnest desire to learn and who had devoted years and means to the effort and who are constantly moved to exertion by the hope of future benefit of association with those whose high principles and great success they emulate, I venture to say that its success would be far beyond that for which we now dare to hope. But aside from

the bearing of this objection on the student grade, I believe it is safe to say that if the Society were to lose to-day all those who cherished a hope of future benefit by association when they joined, the honors of such an ideal membership would rest on the heads of an amazingly small number of individuals.

The grade of student, like all other grades, should be most jealously guarded, to the end that no unworthy applicant should enter. It seems to me that the age limits in the proposed amendment to Article XVI are judiciously placed; but I think the qualifications in the proposed amendment to Article XVII are much too low. At the end of the first year's study at a technical school, it is probable that a determination or real "intent" to pursue the study of engineering has been developed in a small minority of its students only. In the first-class technical schools of the country, probably not much more than one-third of those who begin the course of study pursue it to a successful termination, and few of the two-thirds who abandon it follow the business of engineering, and yet nearly all of those two-thirds complete the studies of the first year. I think, therefore, that the qualification should stand at least as follows: A student shall be one not less than eighteen nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer, and who has pursued that study at a technical school not less than two years, and who, at the end of that time is in full standing in his studies; or one who shall have been engaged in the study and practice of engineering under a competent engineer for not less than three years, and who shall be subject to an examination at that time under the supervision of the Board of Direction.

I do not believe that anything less than this will assure that "intent to become an engineer" which the spirit of the amendment requires. The general character of the examination which would vary to some extent for different cases, could easily be prescribed.

Mr. Moore.—Mr. President, the amendment which I would offer is this:

Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member shall cease to have any connection with the Society.

Mr. W. H. White.—Mr. President, I think it is pretty clear that this thing will have to be revised in some fashion. I would move that the amendments be again submitted to the Committee, with instructions to revise and return them at the earliest possible future date.

Mr. Croes.—Mr. President, there is no use of discussing this suggestion; these amendments have to go out for ballot. Nothing that this meeting can do can prevent it.

Mr. White.—Is that constitutional?

The President.—It is.

Mr. Theodore Cooper.—The intent of Mr. White's motion can, and

ought to be carried out; that after any amendments which may be offered at this meeting have been made, it will be well to refer the whole to some committee, so as to make them harmonious, and this committee to report later in the day. It is impossible to adopt a number of individual suggestions as amendments, and have the whole thing harmonious and complete.

I therefore offer the following motion:

Resolved, That after the individual amendments are discussed and acted upon, a committee be appointed to take up the subject and put it in proper form and make it harmonious for presentation to this meeting at a later hour to-day, or at another session of this annual meeting.

This motion was carried.

Mr. A. M. WELLINGTON.—Mr. President, I believe Mr. Croes' motion is before the meeting. I sincerely hope that Mr. Moore's motion will not pass, for this reason: I am, myself, a great respecter of precedent. So long as we follow the Institution of Civil Engineers—which was the original of all Engineering Societies, which has been a most brilliant success, which has over 5 000 members, and has a higher standard of admission than any other Society—so long as we follow what they have done, we are, I think, safe; but when we depart very radically from what they have done, and make not only a grade of students, but a higher grade of Associate Members merely provisional, we are going too far beyond what that precedent would warrant, and venturing, I think, on dangerous grounds. There are very good reasons why a grade of students should be a temporary grade, from which a man drops if he is not admitted to the higher grades. He may, by the time he has reached the limits of age, abandon the profession altogether, and in that case it is not desirable that he should continue his connection with the Society; but when a man has reached a maturer age and becomes an Associate Member, I see no reason why he should not do so on a permanent basis, nor why he should be dropped altogether from the Society if he does not go higher than this after a certain number of years. We all know that there are engineers under the grade of Members, that there are many men in the Junior grade, who never rise to high positions, men who are excellent assistants, but who are not qualified to become Members, and never will be. It is not best to say to such men as these that they shall drop out of the Society altogether, although it is desirable that they should not be passed on to a higher grade.

While I am on my feet I will say a word with regard to another question. I have been gratified by part of what Mr. Cohen says; it illustrates the small ground for a great many of the objections to this proposed grade of students that have so far been brought forward. In establishing this grade it was proposed to follow exactly the precedent of the Institution of Civil Engineers. In that institution the grade of students is nearly as large as the grade of Members. The student grade

during the past year numbered 934, while the Members were 1,581 in number, the Associate Members 2,340, and the Associates 475.

In the communications which have been read there have been repeated references to such statements as making the Society an organization for "infant baptism," "turning it into a Kindergarten," etc., etc. Unless they are prepared to make the same charges against the Institution of Civil Engineers, those gentlemen are displaying their own utter ignorance of the workings of that institution. Does any one suppose that that is an organization for "infant baptism," or that their student grade is a "kindergarten annex?" Another gentlemen points out that in the French and German Engineering Societies there are no grades corresponding to a student grade. Now, granting that for the sake of the argument, if we compare the French and German Societies with the English Institution, which is the one that this Society would most care to resemble? Certainly the Institution of Civil Engineers, which is a more weighty and influential body, perhaps, than all other engineering organizations put together. In England, every Engineer of any reputation belongs to the Institution of Civil Engineers; he cannot exercise any influence at all professionally unless he belongs to it, and I hope to see the same state of things in this country, that it will be a necessity for good professional standing to belong to the American Society of Civil Engineers. It is for that very reason that I desire and have advocated most heartily the passage of these amendments, because I think there should be an opportunity for every reputable young man, who desires the professional advantage which he may derive from the reading of our papers, etc., and the assistance which he may derive from having his name on our list of members to be able to avail himself of these advantages. The latter object is a perfectly legitimate one; it brings a great many full Members into the Society, and I have no doubt it has a great deal to do with the students in England joining the Institution. You have only to take up any of the English Engineering journals and you will find plenty of young men who are in want of a position, stating in their advertisement that they are "students of the Institution of Civil Engineers." Why not? It speaks well for the young man in every way that he should belong to the Institution, and also, it shows that he has the qualifications necessary to get in.

The only other point that I desire to mention is in regard to the comments already alluded to, to the effect that "these privileges should be granted to every properly qualified and vouched-for applicant, who wants them and is willing to pay for them." There never has been in my mind any idea that the creation of a new junior grade of students would bring in any great amount of additional money to the treasury of the Society. The indirect benefit to the Society will, I believe, in many ways be great, but the proposition is not founded on any desire to increase the Society funds, nor is it fair to so represent it; but I say that

any properly qualified young man who desires the advantage he may get from receiving our Transactions and from his connection with the Society should be allowed these privileges, both for the Society's sake and his own. I have myself had four or five applications from young men, desiring to know how they can become students of the Society. I simply answered these young men that the matter was to come up and be acted upon at this meeting. I am convinced that there is a considerable number of young men throughout the country who will gladly avail themselves of the privileges of the grade, if it is created; but if there be only one, why should the privileges be denied him? I certainly think, as I have said before, that we should for every reason be glad to give to "every properly qualified and vouched-for" applicant the scanty, yet to him important privileges which it is proposed to give in this new grade, accompanied as it is by a needed and important increase in the qualifications for the higher grades.

Mr. D. FitzGerald.—Mr. President, I am one of those who believe that the proposed addition to the Society is an unnecessary one. We now have Members, Juniors and Associates, and the addition of this student grade is one that is not going to add honor to the Society or value to the new grade. There is one point on which I should like to be informed, and that is in regard to the necessity or advisability of changing our name of Junior to that of Associate Member. It seems to me a very objectionable change to make. The word "Associate," whether you couple the word "Member" with it or not, carries to the mind of almost everybody who is connected with the Society the idea of a non-professional member, and I think that the present designation of Junior is far preferable. I hope it will be retained. The very word "Associate" conveys the idea of a member who is not an engineer. I would like to hear the reason for making this change.

Mr. P. Roberts, Jr.—Mr. President, would it not be well to hear from some of the young men? I am not a young man myself, although a little younger than some of those who have gone before me. Mr. Wellington, who commences by saying, "It's English, you know," gives us a strong argument in favor of his views. In all that has been said by the members who are in favor of this amendment, we have had no objection from those members of the Society whom I may term the college professors. They, so far as I understand, are in favor of the proposed amendment.

Mr. Croes.—Mr. E. S. Philbrick is connected with the Massachusetts Institute of Technology, and Mr. D. M. Greene is a Director of the Rensselaer Polytechnic Institute of Troy.

Mr. P. Roberts, Jr.—These are the exceptions that prove the rule. I had so far heard no opinion as to this grade of students from our fellow members, the college professors. Now, I am well aware that a father has much pride in the advancement of his own children, and

probably every member who is a father will remember the gratification he felt when his son had mastered the "*Pons Asinorum.*" So I think it is with much the same feeling of pride that the college professor would point to the student who had just read amost successful paper before the American Society of Civil Engineers. As a young man I remember very well with what pride I became a Junior of this Society, and after that a Member of the Society. I think a young man will work a little harder to become connected with the Society if he must show some record before he becomes one of us.

As to the matter of obtaining the Transactions, I doubt if there is such a great desire for these among college students. I confess, as a college boy myself, I would not have paid much for them. They can be consulted now in the libraries of most of our colleges, and they are thus within the reach of all those who may desire them.

Mr. FITZGERALD.—I move an amendment to the motion: that Associate Member be changed to Junior. I move this as an amendment to Mr. Moore's motion.

The SECRETARY.—Mr. Moore's motion is, that, Associate Members who are not transferred to the grade of Members or Associates within ten years after admission as Associate Member, shall cease to have any connection with the Society.

Mr. FITZGERALD.—I withdraw my motion for the present.

The question was then put upon the motion of Mr. Robert Moore, and the motion was declared lost.

The tellers then reported the result of the canvass of the ballot for officers as follows:

Total number of ballots received		272
Deduct without signature	2	
Voted a blue list	2	
Voted an annual meeting circular	1	
	—	5
Total ballots counted		267

For *President:* Mr. Thomas C. Keefer received 264; for *Vice-Presidents:* Mr. J. James R. Croes received 261; Mr. Robert Moore received 267; for *Secretary and Librarian:* Mr. John Bogart received 258; for *Treasurer:* Mr. George S. Greene, Jr., received 263; for *Directors:* Mr. Alphonse Fteley received 267; Mr. Charles B. Brush, 266; Mr. Stevenson Towle, 263; Mr. Joseph M. Wilson, 262; Mr. Mendes Cohen, 261.

A recess was then taken for lunch.

The session was resumed in the afternoon, Mr. WILLIAM G. HAMILTON, Director of the Society, in the chair in the temporary absence of the President.

The President elect, Mr. THOMAS C. KEEFER, was introduced by the Chair, and made a short address.

The discussion of proposed amendments was resumed.

Mr. C. B. Brush.—Mr. President, as I understand the method in which this discussion is being followed, we are to propose amendments and then discuss them. If that is so, I propose an amendment:

That all reference to student membership be stricken out from the amendments, and also, that the term, "Associate Member" be stricken out, and the term, "Junior" be restored, as at present.

Mr. Brush's motion was seconded.

Mr. Brush.—This motion having been seconded, I will proceed with the discussion.

The statement has been made that college professors have not expressed themselves clearly and definitely upon this subject. I have the honor of being a college professor, having been for fourteen years connected with the School of Engineering of the College of the City of New York. At the same time I have had the honor of being an active Civil Engineer for the past twenty years, and can speak in both capacities. These amendments, I am quite confident, will be of very little practical advantage to the Society, if passed; but what I wish to speak of is their relation to the students themselves.

Every advantage that a student can receive by reason of these amendments is stated here in the amendments; he "shall have the right to use the library and rooms of the Society, and to attend its meetings, subject to such regulations and restrictions as the Board of Direction may adopt."

The difficulty with a student is, as has already been stated, that he has an entirely too exalted idea of himself and of his knowledge of the profession, and it is absolutely essential that clearer views of life and truer views of his relation to the profession should be presented and inculcated in the minds of these students, and until that is done the student is not receptive. Now, I do not imagine that every student with whom I have come in contact is in the course of time to become so qualified in his profession as to become a Member of this Society; and if this student membership can be obtained with so little work as is provided here the honor of a connection with the Society will most certainly diminish in his eyes.

Again, it is a matter of fact that the Transactions of this Society are to be found in the library of nearly every technical school in this country, and any student who can appreciate these Transactions can obtain access to them without difficulty at the present time. Any student who is a resident of the City of New York, or who wishes to consult the library of this Society, can do so by simply presenting a letter of recommendation to the Secretary, stating that the student is worthy of commendation, and asking the privilege of allowing him to consult the works on any subject that he may wish to consider. So that any one who desires may obtain these privileges without interfering with the rules of the Society.

In other words, the higher the standard, the more work the student will accomplish in order to reach that standard. If you lower the standard, the student himself will suffer.

One difficulty we have in all our technical schools is that too much is given the student to digest; he cannot digest what is given him. I think if we took a less number of studies and confined ourselves more to showing the student everything that was to be shown in them that he could grasp, the student might be a more valuable man to himself and to the Society. There are few of these papers that the student can really grasp; many of them are such as can only be understandingly read and appreciated by the practical engineer. And the professor always calls the attention of the student to such papers as may be of benefit to him, and points out such salient points as would escape the attention of the student alone. I think, from all points, the passage of this amendment would be an injudicious measure.

In relation to the other question, the class of Associate Member, I agree with what has been said that the term Junior conveys the idea of the grade of membership very much more clearly than the word Associate or Associate Member.

I am sure that the feeling which some of the members have expressed this morning, that the college professors were in favor of these amendments, is a mistake. I have had the pleasure of conversing with Professor Beardsley, a professor of Swarthmore College, in relation to the effect on the students themselves, and he thinks with me that it would not be good.

Mr. M. COHEN.—Mr. President, I myself have thought that there was no occasion for this change in the Constitution, and that there was no necessity for the introduction of a new grade. There has been, however, a considerable difference of opinion on this subject, and inasmuch as we have with us to-day as a guest, a member of the Institution of Civil Engineers, who has passed through the various grades of Student, Associate Member and finally Member—I refer to Professor Bovey, of McGill College, Canada—and think that if he would favor us with some practical demonstration of the workings of this grade, and the progress through the several grades of membership, it would be very valuable to us.

The CHAIR.—We would be very glad to hear from Professor Bovey.

Professor H. T. BOVEY.—I very much appreciate your kindness in asking me to give you my experience in this matter, although I had hoped to be only a listener to the very interesting discussions which have been going on.

I think there must be a great deal of misapprehension as to the workings of the student class in the English Institution. It is not at all necessary, in the first place, that a student should be apprenticed to a civil engineer; even while at college a young man may become a student

of the Institution of Civil Engineers. I am a Cambridge man myself, and as soon as I left the university I became a student, without any qualification, except that I had a pretty good education and also had the intention of becoming a civil engineer. Afterwards I was apprenticed to the chief engineer of the Mersey Docks. During the time I was a student I derived the utmost advantage from being a student of the Institution, and the feeling among the great body of students is that they derive great and lasting advantages from being connected with the Institution. They have nothing to do with the Institution as members, they are merely students, and they are enabled by their connection with the Institution and by securing the Transactions to obtain as much knowledge as they can digest of the practical experience of the working engineers. Every young fellow, every pupil of an engineer, as soon as he becomes a pupil, makes it a point to join the Institution; and all the chief engineers, all the engineers who hold the highest positions, invariably recommend their pupils to become students of the Institution, feeling that they will derive great advantages from this connection. I speak myself as a former student, and I think that possibly the advantage to non-residents may be just as great as to residents. They are sometimes located in distant parts of the empire, and so have great appreciation during their absence in the knowledge that they will receive the Proceedings of the Institution as soon as they are published, and thus become well informed of all that is going on in engineering work.

I do not think the Institution at home has ever considered any direct advantage that might be derived from such a connection; they considered only the advantages it would confer upon the profession as a whole, and I have no doubt but that view would obtain just as strongly on this side of the water. Every engineer, every working engineer, wherever he is, is desirous of raising the standard of the profession as high as possible. How is that to be done? Are we to say to these young fellows who are getting a fairly good education and training, are we to say that they shall have no connection with an institution in which the practical experience of their elders is given, and no opportunity of attending the meetings by which they might obtain a large amount of experience? Are we to exclude them from these advantages simply because they thus far have had no practice? I maintain that those students who cannot attend the meetings become very theoretically educated, and have, perhaps, a somewhat exalted idea of their own knowledge of the profession. Now, as soon as they are brought into contact with the views of practical experienced engineers, they begin to modify those views a great deal, and the sooner those views are modified the better. How can you modify them better than by allowing these young men to come in and see where their views are harmonious with practice and where they are at variance with practice? If you allow them to come into the meetings, I do not

think that you will ever find that they are too pushing or too ready to express their ideas; in fact, I think they are apt to be rather too modest; but, under any circumstances, they certainly modify their views very considerably. That was my experience. Before I had been connected with the Institution twelve months my views of the profession as a whole were very considerably changed.

A great deal has been said about the primary education of students. Well, I think if some of the Members would take the trouble to look into the Transactions of the Institution of Civil Engineers and just glance over some of the papers that have been written by students, they might modify their opinions on the subject. These papers are read by the students at their meetings. The meetings are presided over by a Member of the Council. Everything is conducted just as orderly and just as quietly as in the Members' meetings; the discussion goes on just as freely, and I think myself that some of the papers and discussions are very good. At the close of the discussions the whole proceedings are summed up by the Member presiding.

The Institution at home does not depend upon, nor is there any thought of any direct advantage to be derived from the students. The first intention was to benefit the profession at large, to raise the standard of the profession, and the idea was that this could best be done by preventing the acquisition of false ideas in the minds of students, by connecting them with the Institution and by giving them the Transactions, and allowing them to come to the meetings. The Institution of Civil Engineers was never so successful as it is now, and it derives a great advantage from filling up its membership from the student class; every time a ballot is taken you will see that so many students are transferred to the higher classes of membership. The Institution must undoubtedly depend in the end upon the students, who will become the engineers of the country. No sooner does a student get into practice than he desires to become a full member; and the sooner he becomes a full member the better it will be for the Institution and for the profession at large.

As to the possible change from Junior to Associate Member, of course I am not qualified to speak, but I might perhaps say one thing. You all know how very much confusion there is as to University degrees of all kinds in Canada, and I believe, in the United States. We never know what a B.A. means or a Ph.D. means. One college would give a degree of Doctor of Philosophy for one class of attainments, and another for another. Now, I think it would be quite possible to harmonize all these titles, so that all over the world it would be known just exactly what qualifications at least a Member or an Associate or a student possessed. According to these amendments, if they were carried, there would be a perfect harmony of requirements and titles over the whole English-speaking race, and that, I think, would be a vast advantage, especially for the profession.

If a man were an Associate Member, they would know just what qualifications he possessed which qualified him as an Associate Member, and I think it would be a great advantage if we could only fix upon some classification which every engineering institution would adopt. So far as the Associate Membership class in England is concerned, there were originally but three classes. When I joined the Institution as a student there were but the three classes: Member, Associate and Students. Then, when they began to elect men who were not engineers to the class of Associate, the associate membership rebelled, and several of them wrote to the council saying that if this were not altered they would leave in a body. The council considered the question, and decided to form another class, that of Associate Member. Those associates who wished were all transferred to Associate Member. This has always worked harmoniously, and there has never been any question of opposition.

Mr. E. S. GOULD.—Mr. President, I merely wish to ask the Professor if the student class in the Institution are allowed to discuss the papers written by Members?

Professor BOVEY.—Any student at the meetings of the engineers can get up and discuss these papers, but, as a rule, they don't take advantage of this privilege.

Mr. GOULD.—You spoke of students' meetings?

Professor BOVEY.—The students' meetings are attended by the students. Papers are presented and discussed by these students. Sometimes two or three members of the council or members of the Institution sit upon the platform, and the whole proceedings are summed up by the presiding officer, who is generally a member of the council.

Mr. D. FITZGERALD.—I have listened with a great deal of interest to the very admirable statement that has been made, but it seems to me that these organizations are not exactly similar, when the circumstances in our country are fully considered. I can well understand how the students in London may get great benefit from their association with the parent society, but we must take into account that here there are local societies which contain, practically, a large part of what would be the student class. In these local societies they have the benefit of meeting and exchanging views, and of obtaining that intellectual food which it is supposed they would get from this Society if they were student members. The only further benefit that I can see is that they would receive our Transactions. But I do not think that we would care particularly to sow our publications broadcast over the country to men who are not with us as Members.

Professor BOVEY.—I think, Mr. President, that the cases are similar rather than different. We have a very large number of local societies in England, which do not conflict in the least with the parent society. There are local societies in Liverpool, Manchester, in fact in all the large cities. So far from conflicting with, I think they add to the standing of

the mother institution. I was myself very intimately connected with the founding of the Liverpool society. There were several young fellows in Liverpool who could not always go up to London to attend the meetings of the Institution, and we thought it would be a very nice thing if we could form a society among ourselves; but never for a moment dreamed of lessening our connection with the mother society. Several of us met together and we formed what is now known as the Liverpool Society of Civil Engineers. I do not think that any local members are not members of the mother institution. I think that the formation of these local societies would not interfere with the benefits or advantages or workings of this Society. I think this great Society, and I presume the whole American profession represented by this Society, desire to promote the interests of the profession of engineering as much as possible.

Mr. CHARLES B. BRUSH.—I now formally offer the following amendment to the proposed amendments:

Resolved, That there be stricken out from the proposed amendments all those portions which refer to the creation of a grade of students.

This motion was seconded, and carried by a rising vote of 30 to 21.

Mr. THEODORE COOPER.—I consider that this amendment is not pertinent to the original proposed amendment.

Mr. J. J. R. CROES.—It seems only proper that this matter should be decided by the whole Society, and not by action taken at this meeting.

Mr. CHARLES B. BRUSH.—I did not have any intention of preventing an expression by the whole Society. If that is the result of the passage of my resolution I shall move to reconsider the vote.

The CHAIR.—If the resolution offered by Mr. Brush stands, then the Society at large will not have an opportunity to vote upon the question of establishing a student grade.

The motion to reconsider was put and declared carried.

The CHAIR.—The question now is upon the adoption of the amendment offered by Mr. Brush, as follows:

Resolved, That there be stricken out from the proposed amendments all those portions which relate to the creation of a grade of students.

Mr. THEODORE COOPER.—I make the point of order, that this amendment is not pertinent to the amendment as originally proposed, and is therefore not in order.

The CHAIR.—The chair decides that any amendment which neutralizes the amendment as originally proposed is not a pertinent amendment, and that therefore this amendment is not in order.

Mr. M. COHEN.—I would like to ask a question. As I understand it myself, we cannot strike out the enacting clause of the amendment, and it must come before the Society for ballot. If a resolution be in order that would call for the appointment of another committee to consider this subject and report to the Society in order that the advice and

deliberations and suggestions which may be arrived at by that committee might accompany the form of letter-ballot, if that would be in order I would offer some such resolution. The reason for that is this: It appears to me that this meeting is scarcely prepared to indorse the suggestions of those amendments just as they now stand; they cannot be neutralized; and while it would appear that there are many arguments in their favor, still this particular time is not the most proper for carrying them out. Now, in allowing these amendments to go to ballot it might be well to have a committee appointed, which might bring out an intelligent vote from the Society, and would present the expressions brought out at this particular time. That is the object, and if it is proper, I will, as I say, offer some such resolution.

Mr. A. M. WELLINGTON.—I do not understand that there is any such power whatever. We can amend this at this meeting, but there is no possible opportunity for the appointing of another committee or for doing anything whatever except to amend these amendments at this meeting and send them out for vote. Constitutionally we can do nothing but amend these and send them out for vote.

A MEMBER.—Would it be proper to express, in connection with the letter-ballot, the sense of this meeting, where we have heard the various changes *pro* and *con* discussed; would it be improper to express that the sense of this meeting was against the addition of the student grade? Might the present meeting be regarded as a committee of the whole Society for considering the arguments *pro* and *con*, and that their judgment was against it?

Mr. COOPER.—These amendments must be recommended or disapproved at this meeting, that they may be sent out.

Mr. CROES.—Mr. Cooper is slightly in error in that respect. This meeting is not obliged to recommend an amendment in order to get it before the Society. "It shall be sent out with such amendments as may be adopted at the Annual Meeting." With regard to the other question raised this discussion will be printed and sent out before the ballot is taken, so that every one will have an opportunity to vote intelligently upon the subject, if he have any intelligence at all.

If the amendments in this form are not adopted, it can be revised in such form as this discussion and the further discussion upon it will lead to, in time for the next Annual Meeting. There is no such terrible hurry about this; it is hardly necessary to the life of the Society that this amendment should be adopted this year. Let us have a good square vote on this question; any five Members can bring it up again next year and we can fight it all over again.

Mr. FITZGERALD.—I don't desire to prolong this discussion, but I would like to ask if it is in order to pass the following resolution:

Resolved, That it is undesirable to amend the Constitution at the present time by adding the student class.

Gen. G. S. GREENE.—I want to ask if it is in order to appeal from the decision of the Chair on this question that has just been decided as to the propriety of striking out all reference to students where it may occur in the amendments. It appears to me nothing is more clear than that to strike out these words is pertinent to this question, and that the ultimate view is to consider whether it is within the working of the Constitution.

The CHAIR.—It is entirely in order to appeal from the decision of the Chair. The question is, shall the decision of the Chair be sustained?

A resolution was offered striking out from the proposed amendments all reference to the student class. A point of order was made that such an amendment was not pertinent to the original amendment. The Chair ruled that such an amendment was not pertinent to the original amendment and was not in order, and the question now is, shall the decision of the Chair be sustained?

A vote was taken and the decision of the Chair was sustained.

Mr. FITZGERALD.—I offered a resolution a moment ago:

Resolved, That it is the sense of this meeting that it is undesirable to amend the Constitution at the present time by adding a student class.

This resolution was seconded and carried.

Mr. E. S. GOULD.—I offer another resolution:

That the sense of this meeting is against the change of title from Junior to Associate Member. That the sense of this meeting is that the term Junior be retained.

This motion was seconded and carried by a standing vote of 35 to 10.

Mr. J. P. DAVIS.—I do not see that that resolution affects the matter at all; this vote has no effect whatever.

Captain O. E. MICHAELIS.—I think that the motion which has been carried conveys to the members who have not been present to-day that the sense of the meeting is against the proposed change, and that is what they wish to be informed of.

The SECRETARY.—Mr. President, the amendments "A" upon the circular have now been discussed by the annual meeting. Before passing to another amendment I would ask if there is anything further to be done with these amendments.

Mr. FITZGERALD.—I have offered an amendment which was merely postponed; that

Wherever in these amendments the words Associate Member is used it be stricken out and the word Junior be put in its place, and that the last clause of Article XVI be struck out.

This amendment was seconded and carried by a rising vote of 34 to 9.

It was, on motion,

Resolved, That Amendment marked *B* be submitted without amendment to the Society for ballot.

It was, on motion,

Resolved, That Amendment marked *C* be submitted without amendment to the Society for ballot.

The following resolution was offered:

Resolved, That it is the sense of this Annual Meeting that the amendment marked *D* should not be adopted.

This motion being seconded, was carried by a rising vote of 44 to 4.

It was, on motion,

Resolved, That the consideration of an amendment to the By-Laws which had been proposed should be postponed till the result of the letter-ballot on amendments to the Constitution should be known, as the amendment to the By-Laws was entirely contingent on the amendments to the Constitution.

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry was presented verbally by Mr. F. COLLINGWOOD, chairman of the Committee.

On motion, the report was accepted and the Committee continued.

Under the resolution previously adopted, Messrs. THEODORE COOPER, A. M. WELLINGTON, ROBERT MOORE, JOSEPH P. DAVIS and CHARLES B. BRUSH were appointed the Committee to put into proper form the amendments to the Constitution, making necessary verbal changes in accordance with the amendments as proposed and as amended by this meeting. The Committe to report at an adjourned meeting to be held Thursday evening.

Mr. R. HERING offered the following resolution:

Whereas, It is deemed highly desirable by the engineering profession that better information should be collected than is now available regarding the intensity of rainfalls in different sections of the United States, particularly with reference to the practical questions involved in the construction of works for water supply and sewerage; and

Whereas, It is entirely feasible for the Signal Service Bureau to obtain such information without increase of force, but simply by the erection of automatic self-registering rain gauges in addition to those now employed; therefore,

Be it Resolved, That the American Society of Civil Engineers respectfully urges upon Congress the desirability of inserting in the next annual appropriation bill for the Signal Service Bureau an item sufficient to cover the expense of placing automatic rain gauges at all principal stations as the Chief Signal Officer may direct;

Resolved, further, That a Committee of three be appointed to urge this matter upon Congress and the appropriate committee.

The resolution was seconded, discussed and adopted.

The following members were appointed the committee under the above resolution: Messrs. RUDOLPH HERING, DESMOND FITZGERALD and DAVID E. MCCOMB.

The Annual Meeting then took a recess till the evening of Thursday, January 19th 1888.

JANUARY 19TH, 1888.—The session of the Annual Meeting was resumed at 20 o'clock. The committee appointed to put in shape for letter-ballot the proposed amendments to the Constitution reported those amendments as follows:

PROPOSED AMENDMENTS.

A. 1.—Amend Article XVI of the Constitution by substituting for the present Article the following:

Article XVI.

The active membership of this Society shall be divided into three classes, to be styled respectively Members, Juniors, and Associates; and each person, when duly elected and qualified, shall receive a certificate of membership indicative of the class to which he belongs.

Juniors shall have all the rights and privileges of Members, excepting the right to hold office or to vote upon admission to membership or changes in the Constitution and By-Laws of the Society. Associates shall have all the rights and priviliges of Members, excepting the right to hold office or to vote.

There shall also be a preparatory grade, to be designated Students of the Society, who shall have the right to receive the Transactions of the Society and to present papers and written discussions. They shall also have the right to use the library and rooms of the Society, and to attend its meetings subject to such regulations and restrictions as the Board of Direction may adopt.

2.—Amend Article XVII of the Constitution by substituting for the present Article the following:

Article XVII.

A Member shall be a Civil, Military, Mining or Mechanical Engineer, not less than thirty years of age who has been in active practice as such for at least ten years, or has graduated at a school of engineering and been in practice seven years, and who has had responsible charge of work as Chief, Resident or Superintending Engineer for at least two years, not as a skillful workman merely, but as one qualified to design, as well as to direct, engineering works.

A Junior shall be one not less than twenty-four years of age, who has had actual practice in some of the branches of Civil, Military, Mining or Mechanical Engineering for at least five years, or has graduated at a school of engineering and been in practice two years, and who continues in actual practice at the time of his application for membership.

An Associate shall be one not less than twenty-five years of age, who is a manager of a railroad, canal or other public work; a geologist, a chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit, qualifying him to co-operate with engineers in the advancement of professional knowledge, but shall not himself be practicing as an engineer.

A Student shall be one not less than eighteen, nor more than twenty-seven years of age, who is engaged in the study of engineering with the intent to become an engineer and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent engineer for not less than two years. A student may remain as such for seven years, or until attaining the age of twenty-seven years, when his connection with the Society shall cease, unless elected to a higher grade.

3.—Amend Article XVIII of the Constitution by substituting for the present Article the following:

Article XVIII.

Applications for admission to any grade of the Society, whether by transfer or otherwise, shall contain a statement, over the candidate's signature, of his age, residence, nature and term of his professional service, and that he will conform to the requirements of membership if elected. Fellows shall not be required to present themselves as candidates; those making the nomination shall state the ground therefor, and certify that the nominee will accept if elected.

Applications for admission as student must be endorsed by some one member or associate, and for admission to any other grade by at least five members, who certify in each case that they personally know the candidate, and that he is worthy of acceptance.

In case of transfer from one grade to another the candidate shall be required to pay as entrance fee to the higher grade, the difference between the entrance fees of the two classes.

4.—Amend Article XIX of the Constitution, by substituting for the present Article the following:

Article XIX.

The election to the grade of student shall be by the Board of Direction, and one negative vote shall exclude.

The election for all other grades, after approval of the application by the Board, shall be by letter-ballot, which shall be canvassed at the next regular meeting held after twenty-five days have elapsed from the time of mailing the ballot lists. Five or more negative votes shall exclude. In case of the non-election of any candidate no notice thereof shall be taken in the proceedings or minutes.

5.—Amend Article XXVIII of the Constitution by adding a clause at the end thereof, making it read as follows:

Article XXVIII.

Upon the written request of ten or more members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a satisfactory defense made, will then notify the member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall, in any event, be the only public announcement of the matter. A student may be summarily expelled at any time by a majority vote of the Board of Direction.

B.—Amend Article XVIII of the Constitution by inserting after the word "*acceptance*" the following:

"Proposals for admission to the Society, of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance."

C.—Amend Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

D.—Amend Article XIX of the Constitution by substituting for the whole Article the following:

Article XIX.

Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for no notice shall be taken thereof in the minutes.

The report of the committee was accepted, and it was directed that the amendments should be issued in the above form for letter-ballot.

The Annual Meeting then adjourned.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—February, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

FEBRUARY 1ST, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates declared elected. As Members: Daniel Seymour Brinsmade, Birmingham, Conn.; Lorenzo Russell Clapp, Brooklyn, N. Y.; Frank Paul Davis, Washington, D. C.; Clarence Delafield, New York City; William Franklin Dennis, Washington, D. C.; Edward Flad (elected Junior, January 7th, 1885), St. Louis, Mo.; Emil Gerber, Sioux City, Iowa; George Blagden Hazlehurst, Baltimore, Md.; Allen Bogardus Hegeman, Ottumwa, Ia.; Alexander Joseph Swift, Albany, N. Y.; Elliott Hinckley Wilson, Butte City, Mont.; as Juniors: Kayajiro Kobayashi, Kansas City, Mo.; George E. Moulthrop, Butte City, Mont.; Robert Ridgway, Sing Sing, N. Y.

The death of Frank Beresford, Jun., Am. Soc. C. E., on December 12th, 1887; the death of Charles H. Fisher, M. Am. Soc. C. E., on January 18th, 1888; and also the death of Fred. Mercur, M. Am. Soc. C. E., on January 10th, 1888, were announced.

A paper on description of the work of constructing a dam across the Potomac River for increasing the water supply of Washington, D. C., by S. H. Chittenden, M. Am. Soc. C. E., was read by the author, and discussed by Messrs. Flagg, Fteley, Croes, R. L. Harris, Gen. G. S. Greene, Brush, Hutton, and the author.

FEBRUARY 15TH.—The Society met at 20 o'clock, Vice President J. James R. Croes in the chair; John Bogart, Secretary.

A paper on the classification of railroad accounts and the analysis of railroad rates, by Gratz Mordecai, Assoc. Am. Soc. C. E., was read.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BRINSMADE, DANIEL SEYMOUR	Birmingham Water Power Co., Birmingham, Ala	Feb. 1, 1888
CLAPP, LORENZO RUSSELL	Assistant Engineer Department City Works, Room 29, Brooklyn, N. Y.	Feb. 1, 1888
DAVIS, FRANK PAUL	48 I st., N. W. Washington, D. C.	Feb. 1, 1888
DELAFIELD, CLARENCE	11 Wall st., New York City	Feb. 1, 1888
DENNIS, WILLIAM FRANKLIN	Assistant Engineer Panama R. R., Mills Building, New York City	Feb. 1, 1888
FLAD, EDWARD	(Elected Junior, Jan. 7, 1885). Mechanical Engineer Water Works Extension, St. Louis, Mo	Feb. 1, 1888
GERBER, EMIL	Resident Engineer Sioux City Bridge, Sioux City, Iowa	Feb. 1, 1888
HAZLEHURST, GEORGE BLAGDEN	Engineer Bridges and Tests, Baltimore and Ohio R. R., Camden Station, Baltimore, Md	Feb. 1, 1888
HEGEMAN, ALLEN BOGARDUS	Resident Engineer Mexican Central Ry., Aguascalientes, Mexico	Feb. 1, 1888
SWIFT, ALEXANDER JOSEPH	Chief Engineer Northern R. R. Department, Delaware and Hudson Canal Co., Albany, N. Y.	Feb. 1, 1888
WILSON, ELLIOTT H.	(Care Wilson and Gillie), Butte, Mont	Feb, 1, 1888

JUNIORS.

KOBAYASHI, KAYAJIRO	(Care Mr. Idzumi), 7 Shimomakichio, Niphonbashi, Tokio, Japan	Feb. 1, 1888
MOULTHROP, GEORGE E	(Care Montana Central Ry.), Butte. Mont	Feb. 1, 1888
RIDGWAY, ROBERT	Assistant Engineer Aqueduct Commission, Box 495, Sing Sing, N. Y.	Feb. 1, 1888

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—March, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MARCH 7TH, 1888.—The Society met at 20 o'clock, Mendes Cohen, Director Am. Soc. C. E., in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Fred. James Amweg, Philadelphia, Pa.; Oberlin Matthies Carter, Savannah, Ga.; Charles Sewall Gowen, Sing Sing, N. Y.; Charles Davis Jameson, New York City; Edward John Landor, Canton, O.; Hunter McDonald (elected Junior April 4th, 1883), New Market, Ala.; George Romaine Olney, Morris Dock, N. Y.; Francis Ensor Prendergast, Newton Highlands, Mass.; George Henry Robinson, Marysville, Mont.; Edward Wegmann, Jr., Englewood, N. J.; Arthur Owen Wilson, Birmingham, Ala.; John Young, Geneseo, N. Y. As Associate: John Haines Warder, Wilmington, Del. As Juniors: David Sylvanus Carll, Kansas City, Mo.; Charles Alfred Hasbrouck, Detroit, Mich.

The vote on the proposed amendments to the Constitution was canvassed. On the proposed amendments creating a Student grade, and raising the standard of qualification for the different grades, the vote was yeas, 137, nays, 142; these amendments, not having received two-thirds of all the votes cast, were declared not adopted. These proposed amendments are those marked **A**, and printed in Proceedings for January, 1888, pages 39 and 40.

The proposed amendment to Article XVIII of the Constitution, by inserting after the word "acceptance" the following:

"Proposals for admission to the Society of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient, in their opinion, to show that the candidate is worthy of acceptance."

Received 251 affirmative and 32 negative votes. The amendment was declared adopted.

The proposed amendment to Article XIX of the Constitution, by adding thereto the following:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a re-consideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

Received 226 affirmative and 55 negative votes. This amendment was declared adopted.

The proposed amendment to Article XIX of the Constitution, by substituting for the whole Article the following:

Article XIX.

"Members shall be elected by the Board of Direction by an affirmative vote of two-thirds of the members thereof. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes."

Received 69 affirmative and 212 negative votes. This amendment was declared not adopted.

The report of the Board of Censors to award the Norman Medal was read and adopted; it is as follows:

"The Board of Censors to award the Norman Medal for the year terminating August 1, 1887, report that, in their judgment, the award should be made to paper No. 340, 'Evaporation,' by Desmond FitzGerald, M. Am. Soc. C. E."

Respectfully submitted,

L. L. BUCK,
E. S. PHILBRICK,
T. J. WHITMAN,
Board of Censors.

The report of the Committee to award the Rowland Prize was read and adopted; the report is as follows:

"The Committee appointed to award the Rowland Prize for the year terminating August 1st, 1887, reports that, in its judgment, the prize should be awarded to Paper No. 361, 'Steel; its Properties; its Use in Structures and in Heavy Guns,' by William Metcalf, M. Am. Soc. C. E."

Respectfully submitted,

E. SHERMAN GOULD,
G. LINDENTHAL,
JOHN BOGART,
Committee.

A paper on "Test of an Edison Incandescent Electric Lighting Plant," by John W. Hill, M. Am. Soc. C. E., was read and discussed by Messrs. J. W. Howell, Field, Flagg and R. L. Harris.

MARCH 21ST, 1888.—The Society met at 20 o'clock, Treasurer G. S. Greene, Jr., in the chair; John Bogart, Secretary.

The death, on March 15th, 1888, of Squire Whipple, Honorary Member of the Society, was announced.

A description of a 30-inch Wooden Conduit, designed and constructed for the Quincy, Ill., Water-works, by Edward Prince, M. Am. Soc. C. E., was read and discussed by Messrs. Greene, Brush and others.

The subject of the Durability of Timber was discussed by Messrs. Greene, H. W. Brinckerhoff, Flagg, Skinner, Buck, Whinnery and Brush.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AMWEG, FREDERICK JAMES	Civil Engineer and Architect, 834 North 40th st., Philadelphia, Pa.	March 7, 1888
CARTER, OBERLIN MATTHIES	First Lieutenant, Corps of Engineers, U. S. A., P. O. Box 133, Savannah, Ga.	March 7, 1888
GOWEN, CHARLES SEWALL	Division Engineer, New Croton Aqueduct, Sing Sing, N. Y.	March 7, 1888
JAMESON, CHARLES DAVIS	State University of Iowa, Iowa City, Iowa.	March 7, 1888

LANDOR, EDWARD JOHN	Vice-President and Engineer Wrought Iron Bridge Co., 127 N. Poplar st., Canton, Ohio	March 7, 1888
MCDONALD, HUNTER	(Elected Junior, April 4, 1883) Engineer-in-charge Nashville, Chattanooga and St. Louis Ry., Fayetteville, Tenn	March 7, 1888
OLNEY, GEORGE ROMAINE	32 West 31st st., New York City	March 7, 1888
PRENDERGAST, FRANCIS ENSOR	Sault Ste. Marie, Mich	March 7, 1888
ROBINSON, GEORGE HENRY	Assistant General Manager and Engineer The Montana Co. (Ltd.), Marysville, Mont	March 7, 1888
WEGMANN, EDWARD, JR.	Division Engineer New Croton Aqueduct, 324 St. Nicholas ave., New York City	March 7, 1888
WILSON, ARTHUR OWEN	Cor. 19th st. and Second ave., Birmingham, Ala	March 7, 1888
YOUNG, JOHN	Geneseo, N. Y.	March 7, 1888

ASSOCIATE.

WARDER, JOHN HAINES	Wilmington, Del	March 7, 1888

JUNIORS.

CARLL, DAVID SYLVANUS	1010 Grove st., Kansas City, Mo	March 7, 1888
HASBROUCK, CHARLES ALFRED	Lincoln House, Cleveland, Ohio	March 7, 1888

DEATHS.

CASS, GEORGE W.	Elected Fellow, M c 30, 1871; died March 21, 1888.
LATIMER, CHARLES	Elected Member, April 5, 1876; died March 25, 1888.
WHIPPLE, SQUIRE	Elected Honorary Member, May 6, 1868; died March 13, 1888.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—April, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

APRIL 4TH, 1888.—The Society met at 20 o'clock, President Thomas C. Keefer in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates were declared elected. As Members: William Creelman Ambrose, Tulare, Cal.; Francis Webster Blackford, Jr., Butte, Mont.; Howard Breen, Pittsburgh, Pa.; Edward Carlos Carter, Chicago, Ill.; John Joseph Donovan (elected Junior April 7th, 1886), Helena, Mont.; Frank Louis Fuller (elected Junior April 4th, 1883), Boston, Mass.; Bruce F. House, Denver, Col.; James MacFarlane, Anaconda, Mont.; Charles Clemens Rose, Scranton, Pa.; Horace Edwards Stevens (elected Junior November 1st, 1876), St. Paul, Minn.; Charles Frederick Stowell, Albany, N. Y.; Arthur Newell Talbot, Champaign, Ill.; Charles Chancellor, Wentworth, Roanoke, Va. As Associate: George Henry Crafts, Atlanta, Ga. As Juniors: William George Clark, Toledo, O.; Arthur Leland Cornell, Tarrytown, N. Y.; Edward Burton Kent, Milwaukee, Wis.; William Willis Penney, St. Louis, Mo.; Louis Lincoln Tribus, New York City; Harry R. Wheeler, Sing Sing, N. Y.

The Secretary announced the deaths, on March 21st, 1888, of George W. Cass, Fellow of the Society, on November 5th, 1887; of W. A. G. Emonts, Jun., Am Soc. C. E., and of Charles Latimer, M. Am. Soc. C. E., on March 25th, 1888.

A paper on Sap in Trees in Winter, by J. Foster Flagg, M. Am. Soc. C. E., was read.

Mr. R. K. Wright, formerly connected with the Engineer Corps of the Panama Canal, gave an informal statement of his observations upon the works in progress there, and the subject was discussed by Messrs. Flagg, F. M. Kelley, Nathan Appleton, Davis, Cooper, Colne and Wright.

APRIL 18TH, 1888.—The Society met at 20 o'clock, Vice President J. James R. Croes in the chair; John Bogart, Secretary.

The Secretary announced the death, on April 7th, 1888, of General Q. A. Gilmore, M. Am. Soc. C. E., and on September 7th, 1878, of George Ainslie, Fellow of the Society.

Papers on the Manufacture of Brick, near Chicago, by D. V. Purington, and on the Manufacture of Slate Brick, by José R. Villalon, were presented and discussed by Messrs. Tomkins, Emery, Bogart, Cartwright, Fteley, Flagg, R. L. Harris and Villalon.

A specimen of wood eaten by white ants, was exhibited by Mr. R. L. Harris.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AMBROSE, WILLIAM CREELMAN	Division Roadmaster Southern Pacific R. R., Tulare, Cal.	April 4, 1888
BLACKFORD, FRANCIS WEBSTER, Jr.	Resident Engineer Union Pacific R. R., Anaconda, Mont.	April 4, 1888
BREEN, HOWARD	Engineer Keystone Bridge Co., Pittsburgh, Pa.	April 4, 1888
CARTER, EDWARD CARLOS	Principal Assistant Engineer Chicago and Northwestern Ry., Chicago, Ill.	April 4, 1888
DONOVAN, JOHN JOSEPH	(Elected Junior April 7, 1886), Chief Engineer Skagit Coal and Transportation Co., 817 Eleventh st., Tacoma, Wash.	April 4, 1888
FULLER, FRANK LOUIS	(Elected Junior April 4, 1883), 12 Pearl st., Room 35, Boston, Mass.	April 4, 1888
HOUSE, BRUCE F.	Collins, Huron Co., Ohio	April 4, 1888
MACFARLANE, JAMES	Anaconda, Mont.	April 4, 1888
ROSE, CHARLES CLEMONS	Division Engineer Delaware, Lackawanna and Western R. R., Scranton, Pa.	April 4, 1888

STEVENS, HORACE EDWARD.....(Elected Junior November 1, 1876), P. O. Box 2,396, St. Paul, Minn..... April 4, 1888

STOWELL, CHARLES FREDERICK..Bridge Engineer New York State Board Railroad Commission, Albany, N. Y..... April 4, 1888

TALBOT, ARTHUR NEWELL.....Assistant Professor Engineering and Mathematics, University of Illinois, Champaign, Ill... April 4, 1888

WENTWORTH, CHARLES CHANCELLOR. Principal Assistant Engineer Construction Department, Norfolk and Western R. R., Roanoke, Va..... April 4, 1888

ASSOCIATE.

CRAFTS, GEORGE HENRY.....Civil Engineer and Contractor, Box 245, Atlanta, Ga..... April 4, 1888

JUNIORS.

CLARK, WILLIAM GEORGE.....City Engineer's Office, Toledo, Ohio..... April, 4, 1888

PENNEY, WILLIAM WILLIS.....Assistant Engineer Water Works, St. Louis, Mo..... April 4, 1888

TRIBUS, LOUIS LINCOLN.....84 Warren st., New York City.. April 4, 1888

WHEELER, HARRY R.....Box 327, Sing Sing, N. Y..... April 4, 1888

DEATHS.

GILMORE, QUINCY A.....Elected Member December 2d, 1868; died April 7th, 1888.

WALLING, HENRY F.....Elected Member May 6th, 1868; died April 8th, 1888.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—May, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MAY 2D, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots for membership were canvassed and the following candidates declared elected: Kenneth Allen, Kansas City, Mo.; Latham Anderson, Cincinnati, O.; Thomas Aspinwall, Boston, Mass.; Robert Bassel, Washington, D. C.; Harry Dean Bush, Montreal, Canada; Clarence Allen Carpenter, Chillicothe, Mo.; George Edwin Evans, Lowell, Mass.; Francis Davis Fisher, New York City; Arthur Hodges, Johnstown, Pa.; George Washington Howell, Morristown, N. J.; Everett Wilson Lewis, Belmont, Wash.; Emile Low, Cedar Bluffs, Va.; Harry Irving Miller, Richmond, Ind.; Arthur Lorenzo Mills, Toledo, O.; Edmund Trowbridge Dana Myers, Richmond, Va.; Philip M. Price, West Point, N.Y.; Beverly Strother Randolph, Frostburg, Md.; Thomas Pearman Shanks, Louisville, Ky.; George Morris Thompson, Boston, Mass.; Thomas Delano Whistler (elected Junior March 5th, 1881), New York City. As Associate: James Breckinridge Speed, Louisville, Ky. As Juniors: James Hillhouse Fuertes, Wichita, Kans.; William Gray, Tarrytown, N. Y.; Horace Joseph Howe, Elmira, N. Y.; Edmund Trobridge Dana Myers, Jr., Richmond, Va.; John Edwin Ostrander, Macedon, N. Y.; Charles Bradley Rowland, Greenpoint, N. Y.; Eugene Raymond Smith,

Islip, N. Y.; William Holland Stair, Fort Riley, Kan.; George Atwater Tibbals, Brooklyn, N. Y.; Samuel Gaylord Tibbals, Brooklyn, N. Y.; Hubert Waldo York, New York City.

The Secretary announced that, under the will of the late Sullivan Haslett, M. Am. Soc. C. E., his professional books relating to the subject of Civil Engineering, were bequeathed to the Society.

A discussion on the paper previously read, upon the Test of an Edison Incandescent Electric Lighting Plant, by John W. Hill, M. Am. Soc. C. E., was presented.

Some data as to Sewage Disposal, prepared by Mr. Joseph Nimo, Jr., were read.

MAY 16TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

The death, on April 8th, 1888, of Henry F. Walling, M. Am. Soc. C. E., was announced.

A paper on High Walls or Dams, to Resist the Pressure of Water, by James B. Francis, Past President Am. Soc. C. E., was presented and discussed by Messrs. Maclay, Frizell, Collingwood, E. Wegman, Jr., H. W. Brinckerhoff, G. S. Greene, Fteley, Bogart, Cooper, North, Emery, Whistler and the author.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Election.
ALLEN, KENNETH.....310 Baird Building, Kansas City, Mo.....	May 2, 1888
ANDERSON, LATHAM.....Johnston Building, Room 49, Cincinnati, Ohio.....	May 2, 1888
ASPINWALL, THOMAS.....12 Pearl st., Boston, Mass.....	May 2, 1888
BASSELL, ROBERT.....Technical Attache Imperial German Legation, Washington, D. C.....	May 2, 1888
BUSH, HARRY DEAN.....Superintendent Lachine Works, Dominion Bridge Co., Montreal, Canada.....	May 2, 1888
CARPENTER, CLARENCE ALLEN....Principal Assistant Engineer Bridges and Buildings, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis...	May 2, 1888
EVANS, GEORGE EDWIN.....Lowell, Mass.....	May 2, 1888

FISHER, FRANCIS DAVIS	Resident Engineer Suburban Rapid Transit Co., 19 West 125th St., New York City	May 2, 1888
HODGES, ARTHUR	Chief Engineer Johnson Steel Street Rail Co., Johnstown, Pa.	May 2, 1888
HOWELL, GEORGE WASHINGTON	Lock Box 58, Morristown, N. J.	May 2, 1888
LEWIS, EVERETT WILSON	Opera House, Room 7, Duluth, Minn.	May 2, 1888
LOW, EMILE	Division Engineer Clinch Valley Division Norfolk and Western R.R., Tazewell C. H., Va.	May 2, 1888
MILLER, HARRY IRVING	Richmond, Ind.	May 2, 1888
MILLS, ARTHUR LORENZO	Chief Engineer Toledo, St. Louis and Kansas City Ry., Toledo, Ohio	May 2, 1888
MYERS, EDMUND TROWBRIDGE DANA	General Superintendent Richmond, Fredericksburg and Potomac R. R., Richmond, Va.	May 2, 1888
PRICE, PHILIP M	Capt. Corps of Engineers, U. S. A., West Point, N. Y.	May 2, 1888
RANDOLPH, BEVERLY STROTHER	Mining Superintendent Consolidation Coal Co., Frostburg, Md.	May 2, 1888
SHANKS, THOMAS PEARMAN	237 Jacob st., Louisville, Ky.	May 2, 1888
THOMPSON, GEORGE MORRIS	Lock Box 1,455, Woburn, Mass.	May 2, 1888
WHISTLER, THOMAS DELANO	(Elected Junior March 5, 1881), 640 Madison avenue, New York City	May 2, 1888

ASSOCIATE.

SPEED, JAMES BRECKINRIDGE	General Manager Louisville Cement Co., 331 West Main st., Louisville, Ky.	May 2, 1888

JUNIORS.

GRAY, WILLIAM	Tarrytown, N. Y.	May 2, 1888
HOWE, HORACE JOSEPH	Assistant to Roadmaster Susquehanna Division New York, Lake Erie and Western R.R., Elmira, N. Y.	May 2, 1888
MYERS, EDMUND TROWBRIDGE DANA, JR.	Assistant City Engineer, Richmond, Va.	May 2, 1888

OSTRANDER, JOHN EDWARD	Care Division Engineer New York State Canals, Albany, N. Y.	May 2, 1888
ROWLAND, CHARLES BRADLEY	Continental Iron Works, Greenpoint, N. Y.	May 2, 1888
SMITH, EUGENE RAYMOND	Islip, Suffolk Co., N. Y.	May 2, 1888
STAIR, WILLIAM HOLLAND	Fort Riley, Kans.	May 2, 1888
TIBBALS, GEORGE ATWATER	148 Milton st., Brooklyn, N. Y.	May 2, 1888
TIBBALS, SAMUEL GAYLORD	148 Milton st., Brooklyn, N. Y.	May 2, 1888
YORK, HERBERT WALDO	22 Cortland st., New York City.	May 2, 1888

DEATH.

BAKER, WILLIAM L. ..... Elected Junior Jan. 6th, 1875; Elected Member Nov. 6th, 1878; died May 28th, 1888.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV, June, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JUNE 6TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots for membership were canvassed, and the following candidates declared elected. As Members: William Henry Baldwin, Yonkers, N. Y.; William Murray Black, St. Augustine, Fla.; Dexter Brackett, Boston, Mass.; Francis Smith Burrowes, Lancaster, Pa.; Willis Chipman, Brockville, Canada; Solomon Lefevre Deyo, Harrison, N. Y.; Henry Goldmark (elected Junior May 7th, 1884), Kansas City, Mo.; Lewis Muhlenberg Haupt, Philadelphia, Pa.; Joseph Warren Hoover, Kansas City, Mo.; Lewis Blake Jackson, Chicago, Ill.; Cassius William Kelley (elected Junior March 1st, 1882), New Haven, Conn.; Alexander Macomb Miller, St. Louis, Mo.; Richard Montfort, Louisville, Ky.; John Frank Stevens, Marquette, Mich. As Associate: Louis De Coppet Berg, New York City. As Juniors: Andre Pierre Tachard, New York City; Job Tuthill, Ionia, Mich.

The death, on May 28th, 1888, of William L. Baker, M. Am. Soc. C. E., was announced.

Details as to Convention arrangements were announced.

An account of the First Locomotive on the Philadelphia, Germantown and Norristown Railroad was read.

JUNE 20TH, 1888.—The Society met at 20 o'clock, Director A. Fteley in the chair; John Bogart, Secretary.

Further details as to the approaching Convention were announced.

A paper on an Automatic Waste Weir, by A. D. Foote, M. Am. Soc. C. E., was read, and discussed by Messrs. Fteley, Croes, Davis, Bogart and Ackenheil.

OF THE BOARD OF DIRECTION.

FEBRUARY 1ST, 1888.—Applications were considered. Financial business was transacted.

MARCH 8TH, 1888.—Applications were considered. Financial business transacted.

APRIL 15TH, 1888.—Applications were considered. A committee to determine details as to the Convention was appointed.

MAY 3D, 1888.—Applications were considered. Time for holding the Convention discussed.

MAY 15TH, 1888.—Proposition for sale of the Transactions to local societies and to individuals considered. Regular business transacted.

JUNE 7TH, 1888.—Applications were considered. Arrangements for Convention discussed. A form of circular in reference to publications was prepared.

JUNE 27TH, 1888.—Details as to Convention perfected.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BALDWIN, WILLIAM HENRY	Engineer Board Water Commissioners and City Surveyor, Manor Hall, Yonkers, N. Y.	June 6, 1888
BLACK, WILLIAM MURRAY	Captain Corps of Engineers, U. S. A., P. O. Box 541, Asheville, N. C.	June 6, 1888
BRACKETT, DEXTER	Superintendent Eastern and Mystic Divisions Boston Water Works, 221 Federal st., Boston, Mass.	June 6, 1888
BURROWES, FRANCIS SMITH	U. S. Engineers' Office, Portland, Maine	June 6, 1888
CHIPMAN, WILLIS	City Engineer, Brockville, Ontario, Canada	June 6, 1888

DEYO, SOLOMON LEFEVRE.....Assistant Engineer New York, New Haven and Hartford R. R., Harrison, N. Y..... June 6, 1888

GOLDMARK, HENRY.....(Elected Junior May 7, 1881) office General Manager Kansas City, Fort Scott and Gulf R. R., Kansas City, Mo..... June 6, 1888

HAUPT, LEWIS MUHLENBERG....Consulting Engineer, University of Pennsylvania, Philadelphia, Pa..... June 6, 1888

HOOVER, JOSEPH WARREN .....Engineer and Manager Western office Wrought Iron Bridge Co., Kansas City, Mo..... June 6, 1888

JACKSON, LEWIS BLAKE.....Chief Engineer Elgin, Joliet and Eastern Ry., Chicago, Ill. June 6, 1888

KELLY, CASSIUS WILLIAM.....(Elected Junior March 1, 1882) 18 City Hall, New Haven, Conn..... June 6, 1888

MILLER, ALEXANDER MACOMB...Major Corps of Engineers, U. S. A., St. Louis, Mo..... June 6, 1888

MONTFORT, RICHARD.....Chief Engineer Louisville and Nashville R. R., Louisville, Ky..... June 6, 1888

STEVENS, JOHN FRANK.....Principal Assistant Engineer Duluth, South Shore and Atlantic Ry., Marquette, Mich. June 6, 1888

ASSOCIATE.

BERG, LOUIS DE COPPET.....111 Broadway, New York City. June 6, 1888

JUNIORS.

TACHARD, ANDRE PIERRE.....15 rue Louis le Grand, Paris, France..... June 6, 1888

TUTHILL, JOB.....Assistant Engineer Detroit, Lansing and Northern R. R. Ionia, Mich..... June 6, 1888

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—July, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

Annual Convention of the Society.

Held at Milwaukee, Wis., June 28th – July 4th, 1888.

First Session, June 28th, Morning.—The Convention was called to order at 10.30 in the Hall of the Athenæum Building, by Vice-President J. James R. Croes, who read the provisions of the Society law relating to Conventions.

On nomination of Past President D. J. Whittemore, George H. Benzenberg, M. Am. Soc. C. E., of Milwaukee, was elected permanent Chairman of the Convention. Mr. John Bogart, Secretary of the Society, was elected Secretary of the Convention.

On taking the chair, Mr. Benzenberg addressed the Convention and, in concluding, announced the arrangements made by the local committee.

A paper by Charles B. Brush, Director Am. Soc. C. E., on "Some Facts in Relation to Friction, Waste and Loss of Water in Mains," was read by the author and discussed by Messrs. Benzenberg, Francis, Weston, Whitman, Crowell, Loweth, Goad and the author.

Second Session, June 28th, Afternoon.—Mr. G. H. Benzenberg in the chair. The discussion on the paper, "Some Facts in Relation to Friction, Waste and Loss of Water in Mains," was continued by Messrs. Fanning, Fteley, Merriman, Croes, Oberlin Smith, G. W. Pearsons, Benzenberg and the author.

A paper by E. E. Russell Tratman, Jun. Am. Soc. C. E., on "English Railroad Track," was read by the author.

During the afternoon of June 28th a reception was given at the Athenæum to the wives, daughters and lady guests of the Members, by the Woman's Club of Wisconsin.

THIRD SESSION, June 28th, Evening.—Mr. G. H. Benzenberg in the chair. Public Meeting. An address was made by E. S. Elliott, Esq., City Attorney, in behalf of the citizens of Milwaukee. A response to this address was made by J. J. R. Croes, Vice-President of the Society.

An address was made by Mr. Charles L. Colby, F. Am. Soc. C. E., on behalf of the local membership of Milwaukee. A response to this address was made by Joseph M. Wilson, Director of the Society.

The Annual Address of the President of the Society, Mr. Thomas C. Keefer, was, in the absence of the President, read by the Secretary.

After the conclusion of the President's Address, the following resolution was unanimously adopted by a rising vote:

Resolved, That, in view of the sad affliction that has prevented the attendance of our much respected President at this Convention, we tender him our most sincere sympathy and condolence in his time of bereavement.

FOURTH SESSION, Friday, June 29th, Morning.—Mr. G. H. Benzenberg in the chair. A paper by Joseph T. Dodge, M. Am. Soc. C. E., on "Destruction of Rails by Excessive Weights," was read by the author, and that paper and the paper on "English Railroad Track," by E. E. R. Tratman, were discussed by Messrs. W. W. Rich, Thomas Rodd, P. Roberts, Jr., F. W. Skinner, Gottlieb, Loree, W. H. Jennings, H. Goldmark, and C. F. Loweth.

On the suggestion of Mrs. James B. Francis, a vote of thanks, in behalf of the ladies of the Society, was tendered to the ladies of Milwaukee for their many courtesies and very kind attentions to the ladies in attendance at the Convention.

FIFTH SESSION, June 29th, Afternoon.—Mr. H. G. Benzenberg in the chair. A paper by G. W. Pearsons, M. Am. Soc. C. E., on "Siphons for the Water Works of Kansas City," was read by the author, and discussed by Messrs. S. B. Downes, C. B. Brush and the author.

A paper by Colonel William P. Craighill, M. Am. Soc. C. E., on "Some Observations on the Subject of the Improvement of Several of the Rivers of the Atlantic Coast," was read, in the absence of the author, by Mr. C. P. E. Burgwyn, M. Am. Soc. C. E.

The business meeting of the Convention was held during this afternoon; the minutes will be found on a following page.

On the evening of June 29th a reception was given at the Athenæum

to the visiting members and guests of the Society, by the local members at Milwaukee.

SIXTH SESSION, Saturday, June 30th, Morning.—Mr. G. H. Benzenberg in the Chair. The President of the Association for the Improvement of Milwaukee, Mr. Goodrich, presented, with some remarks, a souvenir book to the members present. A response was made by Mr. C. B. Brush, Director.

A paper, previously published in the Transactions, on "The Venturi Water Meter," by Clemens Herschel, M. Am. Soc. C. E., was discussed by Messrs. Merriman, J. B. Francis, J. B. Johnson, O. H. Landreth and the author.

A paper by James B. Francis, Past President Am. Soc. C. E., on "High Walls or Dams to Resist the Pressure of Water," was read by the author, and discussed by Messrs. F. Collingwood, J. B. Johnson, N. M. Edwards, A. Fteley and the author.

The papers on "The Brick Industry About New York City," by Calvin Tomkins, Assoc. Am. Soc. C. E.; "A Note on Brick Making in Sinaloa, Mexico," by Don F. Sosa y Avela; "Slate Bricks," by José R. Villalon; "The Manufacture of Brick near Chicago," by D. V. Purington, were presented, and the subject of brick manufacture was discussed by Messrs. D. V. Purington, J. T. Dodge, Benzenberg, Edwards, J. B. Francis, Dempster, Bogart, J. B. Johnson, Robert Moore, Seaman, C. L. Gates, I. O. Baker and A. D. Conover.

At the request of the local committee, Prof. Linderfelt made a short address on the subject of "Volapuk; the Importance of an International Language for Scientific Purposes."

On the afternoon of Saturday, June 30th, visits were made, by special train, to the works of E. P. Allis, the shops of the Chicago, Milwaukee and St. Paul Railway, and the works of the Milwaukee Cement Company.

In the evening an opera at Schlitz's Park was given, complimentary to the Society, at the request of the local members.

SEVENTH SESSION, Monday July 2d, Morning.—Mr. G. H. Benzenberg in the chair. A paper by A. J. DuBois, Jun. Am. Soc. C. E., on "The Weights of Bridge Trusses," was read.

A paper by G. Leverich, M. Am. Soc. C. E., on "An Investigation to Determine the Strains in a Hollow Cast Iron Disk, Cooled from the Interior," was, in the absence of the author, read by the Secretary.

A paper by William P. Williams, C. E., on "The Panama Canal," was, in the absence of the author, read by the Secretary.

A paper by J. R. Wardlaw, M. Am. Soc. C. E., on "The Method Used for Moving the Brighton Beach Hotel," was read by the author.

The papers already published on the Inspection and Maintenance of Railway Structures and on Inspectors and Bridge Work, were discussed by H. B. Seaman, M. Am. Soc. C. E.

A paper by C. L. Strobel, M. Am. Soc. C. E., on "Z-Iron Columns," was presented and discussed by D. J. Whittemore, Past President Am. Soc. C. E.

A paper by J. W. Post, C. E., on "Maintenance-Expenses of Wood and Metal Railroad Ties," with discussion, by E. E. Russell Tratman, was read.

On motion of Mr. J. J. R. Croes, the thanks of the American Society of Civil Engineers were tendered to the Woman's Club of Wisconsin for the courtesies extended to the Society during the Annual Convention.

On motion of Mr. A. Fteley, a resolution was adopted, tendering the thanks of the Society for the cordial welcome extended by Milwaukee, and for the uniform courtesies experienced from the citizens of that place.

On motion of Mr. Mendes Cohen, a vote of special thanks was tendered to the members of the Local Committee.

On motion of Mr. Percival Roberts, Jr., the thanks of the Society were tendered to Mr. G. H. Benzenberg, Chairman of the Local Committee and presiding officer of the Convention.

On motion of Mr. G. H. Benzenberg, the thanks of the Society were tendered, by a rising vote and cheers, to Mr. D. J. Whittemore, to which Mr. Whittemore responded with a few remarks.

On motion of Mr. C. B. Brush, the thanks of the Society were tendered to Messrs. E. P. Allis & Co., the Chicago, Milwaukee and St. Paul Railway and the Milwaukee Cement Company for courtesies during the Society Excursion.

The Convention then adjourned.

On the afternoon of July 2d, the members and guests were taken by carriage to points of interest about the city and to the National Soldiers' Home.

On the evening of July 2d, a banquet at the Plankinton Hotel was tendered to the members and guests by the Local Committee. There were present about two hundred persons, including a large number of ladies. The toasts and speakers in response were as follows: The President, J. J. R. Croes; "Milwaukee," G. Hazleton; "Wisconsin," Horace Rublee; "Unknown," Charles L. Colby; "Woman," Percival Roberts, Jr.; "Man," Miss Bessie Hearding; song, "A man's a man for a' that;" "The Secretary," John Bogart; "Past," D. J. Whittemore; "Railway Development," Mendes Cohen; "Wind," George W. Peck; "German Engineering," Robert Bassel; "Engineering Education," Charles B. Brush; "Hydraulics," Alphonse Fteley.

On Tuesday, July 3d, an excursion by special train was made to Appleton and Kaukauna, *via* the Milwaukee and Northern Railroad, where the water power, the pulp and paper mills and the electric street

railway were inspected. The party returned to Milwaukee *via* the Milwaukee, Lake Shore and Western Railroad.

On Wednesday, July 4th, a visit was made to Oconomowac, *via* the Chicago, Milwaukee and St. Paul Railway. The guests were driven about Lac La Belle and had a steamboat ride upon the lake. After dinner, at Oconomowoc, the party proceeded to Waukesha for supper, and thence returned to Milwaukee by the same train.

A number of members took an excursion, after the close of the Convention, to the mineral regions of Wisconsin and Michigan, and to the Sault Ste. Marie.

The following 133 members were in attendance at the Convention:

Almon B. Atwater, Detroit, Mich.; Samuel G. Artingstall, Chicago, Ill.; Edward P. Allis, Thomas Appleton, Milwaukee, Wis.; Thomas W. Baldwin, Bangor, Me.; Frederick Brooks, Boston, Mass.; John W. Bacon, Danbury, Conn.; John Bogart, Charles B. Brush, New York City; William F. Booth, Poughkeepsie, N. Y.; Robert Bassel, Washington, D. C.; C. P. E. Burgwyn, Richmond, Va.; M. J. Becker, A. F. Brown, Pittsburgh, Pa.; C. Newton Brown, Columbus, O.; Cabell Breckinridge, Covington, Ky.; Onward Bates, George H. Benzenberg, Milwaukee, Wis.; Daniel Bontecou, Kansas City, Mo.; Moses Burpee, Woodstock, N. B., Canada; J. James R. Croes, New York City; William B. Cogswell, Syracuse; Charles L. Crandall, Ithaca, N. Y.; Mendez Cohen, Baltimore, Md.; J. Foster Crowell, Cincinnati, O.; Joseph P. Card, Edward C. Carter, Chicago, Ill.; C. A. Carpenter, Charles L. Colby, Albert Conro, Milwaukee; Allan D. Conover, Madison, Wis.; Joseph P. Davis, Stancliff B. Downes, New York City; Charles Davis, Alexander Dempster, Pittsburgh, Pa.; D. C. Dunlap, Chicago, Ill.; Charles E. L. B. Davis, Milwaukee, Wis.; Joseph T. Dodge, Duluth, Minn.; Robert L. Engle, La Salle, Ill.; N. M. Edwards, Appleton, Wis.; Howard N. Elmer, St. Paul, Minn.; James B. Francis, Lowell, Mass.; Alphonse Fteley, New York City; Edward Flad, Henry Flad, St. Louis, Mo.; John A. Fulton, Wellington, Kans.; John T. Fanning, Minneapolis, Minn.; Edward B. Guthrie, Buffalo, N. Y.; Charles E. Goad, Montreal, Canada; C. L. Gates, Toledo, O.; Philip Golay, Vevay, Ind.; A. Gottlieb, Chicago, Ill.; Henry Goldmark, Kansas City, Mo.; Gideon F. Haynes, Boston, Mass.; James D. Hawks, Detroit, Mich.; William M. Hughes, Cleveland, O.; E. A. Hermann, Indianapolis, Ind.; John W. Hill, Cincinnati, O.; Charles Hermany, Louisville, Ky.; M. L. Holman, St. Louis, Mo.; S. A. Harrison, H. J. Hilbert, Milwaukee, Wis.; Frank W. Handy, Olaf Hoff, Minneapolis; Horace E. Horton, Rochester, Minn.; William H. Jennings, Columbus, O.; J. B. Johnson, St. Louis; Mo.; K. Kobayashi, Chicago, Ill.; F. W. Kimball, Milwaukee, Wis.; Olin H. Landreth, Nashville, Tenn.; Thomas D. Lovett, Cincinnati, O.; L. F. Loree, Wellsville, O.; Moritz Lassig, Harry H. Latham, William

H. Lotz, Chicago, Ill.; Frank Lawler, Burlington, Ia.; Charles F. Loweth, St. Paul, Minn.; George E. Mann, Buffalo, N. Y.; Mansfield Merriman, Bethlehem, Pa.; John McLeod, Louisville, Ky.; Robert E. McMath, Robert Moore, St. Louis, Mo.; R. R. Minturn, Milwaukee, Wis.; George A. Marr, S. D. Mason, St. Paul, Minn.; George B. Nicholson, Covington, Ky.; Edwin G. Nourse, Chicago, Ill.; Joseph O. Osgood, Cleveland, O.; Thomas W. Orbison, Appleton, Wis.; William H. Paine, George H. Pegram, Henry G. Prout, New York City; H. W. Parkhurst, Chicago, Ill.; Charles J. Poetsch, Milwaukee, Wis.; Galen W. Pearsons, Alexander Potter, Kansas City, Mo.; Percival Roberts, Jr., Philadelphia; Thomas Rodd, Pittsburgh, Pa.; Robert L. Read, Cincinnati, O.; Albert F. Robinson, L. W. Rundlett, St. Paul; W. W. Rich, Minneapolis, Minn.; Albert B. Rogers, Waterville, Wash.; C. C. Schneider, Frank W. Skinner, New York City; John S. Schaeffer, Newark; Oberlin Smith, Bridgton, N. J.; Henry B. Seaman, Philadelphia; Felician Slataper, Pittsburgh, Pa.; J. W. Schaub, Detroit, Mich.; George H. Simpson, Terre Haute, Ind.; Robert A. Shailer, C. L. Strobel, Chicago. Ill.; Horace E. Stevens, St. Paul, Minn.; C. H. Sawyer, Scottsville, Kans.; E. E. Russell Tratman, Alfred W. Trotter, New York City; Edward B. Taylor, Pittsburgh, Pa.; Job Tuthill, Ionia, Mich.; Arthur N. Talbot, Champaign, Ill.; George W. Vaughan, Cleveland, O.; James R. Wardlaw, New York City; O. B. Wheeler, Joseph M. Wilson, Philadelphia; Jesse W. Walker, Pittsburgh, Pa.; L. L. Wheeler, George Y. Wisner, Detroit, Mich.; Frederick C. Weir, Samuel Whinery, Cincinnati, O.; Thomas J. Whitman, St. Louis; J. A. L. Waddell, Kansas City, Mo.; John F. Wallace, Fort Madison, Ia.; Don J. Whittemore, Milwaukee, Wis.

Fifty-nine ladies of the families of members accompanied them on the occasion of this Convention.

MEETINGS OF THE SOCIETY.

JUNE 29TH, 1888 (business meeting during the Annual Convention at Milwaukee, Wis.).—J. J. R. Croes, Vice-President Am. Soc. C. E., in the chair; John Bogart, Secretary.

The report of the Committee on Uniform Standard Time (printed hereafter) was presented, and read by the Secretary. On motion, the report of the Committee was accepted, and the Committee continued.

The following resolution, offered by the Chairman of this Committee, was presented and discussed, and, on motion, this resolution, and the treatise to which it refers, was referred to a Special Committee, to consist of Messrs. Frederick Brooks and Percival Roberts, Jr.; this Committee to report at a future meeting of the Society. The resolution is as follows:

"*Resolved*, That, in accordance with the recommendations contained in the report of the Committee on Standard Time, the treatise on Time

and its Notation, be brought to the notice of the Bureau of Education, with the request that it be widely disseminated for the use of the schools of the United States, and that the Superintendents of Education be invited to enjoin teachers to give special lectures and lessons on the subject to the pupils attending the schools, and that such other means be taken as may be deemed best to attain the object aimed at by the report of the Committee."

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry was presented by the Secretary. On motion, the report was accepted and ordered printed, and the Committee was continued.

On behalf of the Committee to consider the Proper Relation to each other of the Sections of Railway Wheels and Rails, Mr. Thomas Rodd announced that a large amount of information had been gathered by that Committee, and presented its report of progress. On motion, this Committee was continued, and the report of progress accepted and ordered printed.

The Committee appointed at the last annual meeting to formulate recommendations with reference to the Grades and Titles of Engineers, through their chairman, Mr. D. J. Whittemore, presented a partial report, which was, at Mr. Whittemore's request, on motion, referred back to the Committee to perfect.

A statement as to the progress made by the Committee on Subscriptions to the Building Fund of the Society was presented, and the Committee continued.

The next business in order being the appointment of a Committee to nominate officers for the ensuing year, the Secretary, by request, read the method adopted at the previous Convention, with the geographical distribution as follows :

No. 1. Resident Members, New York City and 50 miles around it.
No. 2. Rest of New York State, New England and Canada.
No. 3. New Jersey, Pennsylvania, Delaware, Ohio, Indiana, Michigan.
No. 4. Illinois, Missouri, Wisconsin, Minnesota, Dakota, Nebraska, Washington Territory, Oregon.
No. 5. All the rest of the States and Mexico.

On motion of Mr. R. E. McMath, the following geographical distribution was substituted :

No. 1. Resident Members, New York City and 50 miles around.
No. 2. The rest of New York, New England and Canada.
No. 3. Pennsylvania and the South Atlantic States.
No. 4. The southern States, with Missouri, Kansas and Colorado, and the Pacific Slope.
No. 5. The Ohio River States and the Northwest.

A recess of five minutes was then taken, in order that those present from each of the several districts might select names to put in nomination. The session was then resumed, and on nomination of the members from each of these districts, the following Committee was appointed: District No. 1, William G. Hamilton; No. 2, Frederic P. Stearns; No. 3, Alexander Dempster; No. 4, William B. Knight; No. 5, A. B. Rogers.

On motion, it was resolved that all reports of special and standing committees should be transmitted to the Secretary at least sixty days before the Annual Convention, the Secretary to have the same printed and distributed to the members at least twenty days before the Convention.

On motion, it was ordered that the current ballot for membership be canvassed at an adjourned meeting, to be held at New York on July 14th.

The meeting then adjourned to that date.

JULY 14TH, 1888.—At an adjourned session of the meeting of July 4th, held at New York, July 14th, 1888, ballots were canvassed, and the following candidates were declared elected: Charles Leroy Annan, St. Paul, Minn.; John Quincy Barlow (elected Junior April 7th, 1886), Omaha, Neb.; William Henry Booth, New York City; George Barker Burbank, Brewster, N. Y.; William Dexter Bullock (elected Junior September 5th, 1877), Providence, R. I.; Otto Carl Edward Budde, Essen, Germany; Oswald Herbert Ernst, Galveston, Tex.; Edwin Augustus Fisher, Rochester, N. Y.; Edward Appleton Greene, Zanesville, O.; Daniel Jones Lucas (elected Junior September 6th, 1876), New York City; John Lundie, Chicago, Ill.; Frederick Weinhagen, Milwaukee, Wis. As Juniors: Walter McCulloh, Brewster, N. Y.; Albert Howell Porter, Brewster, N. Y.; Ira Alexander Shaler, New York City; Jose Ramon Villalon y Sanchez, Bethlehem, Pa.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Election.
ANNAN, CHARLES LE ROY	Engineer's office Union Pacific Ry., Omaha, Neb	July 4, 1888
BARLOW, JOHN QUINCY	(Elected Junior April 7, 1886), Division Engineer Union Pacific Ry., Leadville, Colo.	July 4, 1888
BOOTH, WILLIAM HENRY	Lonsdale, Flixton, Manchester, England	July 4, 1888
BUDDE, OTTO CARL EDWARD	Essen, Prussia	July 4, 1888
BULLOCK, WILLIAM DEXTER	(Elected Junior September 5, 1877), Assistant Engineer in charge Bridges, City Engineer's office, Providence, R. I.	July 4, 1888

BURBANK, GEORGE BARKER	Division Engineer New Croton Aqueduct, Brewster, N. Y.	July 4, 1888
ERNST, OSWALD HERBERT	Major Corps of Engineers, U. S. A., Galveston, Texas	July 4, 1888
GREENE, EDWARD APPLETON	Chief Engineer Zanesville and Ohio River Ry., Zanesville, Ohio	July 4, 1888
LUCAS, DANIEL JONES	(Elected Junior September 6, 1876), Engineer in charge of Main's Standard Gas Light Co., 515 East 115th st., New York City	July 4, 1888
WEINHAGEN, FREDERICK	Milwaukee, Wis.	July 4, 1888

JUNIORS.

MCCULLOH, WALTER	Assistant Engineer Sodom Dam, Brewster, N. Y.	July 4, 1888
PORTER, ALBERT HOWELL	New Croton Aqueduct, Brewster, N. Y.	July 4, 1888
SHALER, IRA ALEXANDER	Assistant Engineer New Aqueduct Commission, 103 St. Nicholas ave., New York City	July 4, 1888
VILLALON Y SANCHEZ, J. RAMON	South Bethlehem, Pa.	July 4, 1888

REPORT OF THE SPECIAL COMMITTEE ON STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL CONVENTION, JUNE 29TH, 1888.

The Committee beg leave to refer to the report submitted at the Annual Meeting of the Society in January last. The progress of the time reform movement throughout the world was therein set forth at some length. Since that date the movement has made steady, although not rapid, progress wherever the twenty-four hour notation has been adopted in the operating of railways. It continues to command the good opinion of the large majority of railway men. Indeed it may be said to obtain the favor of all who have had opportunities of experiencing its advantages.

In the last report it was stated that the twenty-four hour notation was in use for railway purposes in every province of Canada, from Nova Scotia to British Columbia. It has not yet been adopted on all the railways of the Dominion, but as stated, it is in use in each of the eight provinces, and there is an intention to extend its use. In Manitoba it has been introduced now for about two years, and one letter may be quoted to show to what extent it is accepted by the general public. The Chief Superintendent of Education wrote on the 4th of the present month that the new time notation is gradually being brought into common use. "It cannot be expected (he adds) that references to time under the old

notation will cease at once, but there is every indication, here at least, that it will not be long before the new system will become universal."

This one fact shows very clearly that however strong the influence of long established usage and old customs may be, a reform such as this, which appeals direct to the reason and common sense of the community, must sooner or later be crowned with complete success.

Suggestions have come from several quarters as to the adoption of means more speedily to destroy the adhesion of the great mass of people to the old usages. There can not be a doubt that so soon as the railway companies see their way to make the change the public will accept it, and in course of a few years the old notations will be a thing of the past in America. In the meanwhile it has been suggested that the subject of time and its proper notations should be brought in its educational aspect before the youth of the country; that, in fact, means should be taken to familiarize the minds of every boy and girl of school age with the principles of the change.

No more effectual means could be devised than the one proposed. The children attending school would not simply get their minds imbued with the new ideas, but they would in many cases carry them to their homes, and thus educate their fathers and mothers. Thus, in a very few years, certainly by the time children of now average school age reach manhood, the community would be prepared to demand the change.

With the view of bringing the subject before the schools of the country, the Chairman of the Committee has prepared a treatise on Time and its Notations, which he has pleasure in placing at the disposal of the Society.

It was in no small degree through the public-spirited efforts of the American Society of Civil Engineers that Standard Time was introduced in North America. The advantages of that first step in Time Reform are acknowledged to be incalculable. The second step, the general adoption of the twenty-four hour notation, is not less important, and it will only be from further sustained efforts that this rational change will be accomplished.

It is recommended that the Treatise now submitted be brought to the notice of the Bureau of Education at Washington, with the request that it be generally disseminated, and that Superintendents of Education in the several States and cities be invited to enjoin teachers under their supervision to give special lectures and lessons on the subject of which it treats to the pupils attending the schools.

Through the medium of the schools it is believed that in a comparatively few years the people will have their minds familiarized with the whole question, and that if this course be followed it will eventually lead to the adoption of an "American Normal Time," by which perfect uniformity of reckoning will prevail throughout the Continent.

SANDFORD FLEMING,
Chairman.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—August-September, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)
(No meetings of the Society were held in August.)

OF THE SOCIETY.

SEPTEMBER 5TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

Ballots for membership were canvassed, and the following candidates declared elected. As Members: William James Baldwin, New York City; Elbridge Leonard Brown, Brockton, Mass.; Edward Bertie Codwise, Kingston, N. Y.; Walter Whaley Curts, Fort Madison, Ia.; Arthur Powis Herbert, Mexico, Mex.; Edward Maguire, Willetts Point, N. Y.; Arthur John Mason, Kansas City, Mo.; Charles Henry Nash, Bloomfield, N. J.; William Scherzer, Chicago, Ill.; William Humphrey Wightman, Palouse, Wash. As Associate: William Gibson, Jr., New York City. As Juniors: St. John Clarke, High Bridge, N. Y.; Walter H. Gahagen, La Salle, Ill.; Mason Delano Pratt, Johnstown, Pa.

The report of the Committee to formulate Recommendations with reference to Grades and Titles of Engineers on Public Works was presented. (Printed below.)

A paper by Edward E. Magovern, Jun., Am. Soc. C. E., on "The Theory of Aqua Ammonia Engines, with Results of Tests upon an Engine of this Type, Operating an Edison Incandescent Lighting Plant," was presented.

SEPTEMBER 19TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair; John Bogart, Secretary.

Discussions on the paper by Colonel William P. Craighill, M. Am. Soc. C. E. "Some Observations on the Subject of the Improvement of Several of the Rivers of the Atlantic Coast," by Capt. W. H. Bixby, F. Collingwood and Lieut. O. M. Carter, Members of the Society, were presented, and the subject was discussed by Messrs. Emery, H. W. Brinckerhoff, Hamilton, A. O. Wilson, Boller, Bogart and Flagg.

OF THE BOARD OF DIRECTION.

AUGUST 1ST, 1888.—Applications were considered.

SEPTEMBER 6TH, 1888.—Applications were considered. Financial business transacted.

Messrs. Frederic Graff, Theodore Cooper and E. N. K. Talcott were appointed the Board of Censors to award the Norman Medal.

Messrs. B. M. Harrod and Frank H. Hambleton were appointed, with the Secretary, the Committee to award the Rowland Prize.

REPORT OF COMMITTEE TO FORMULATE RECOMMENDATIONS WITH REFERENCE TO GRADES AND TITLES OF ENGINEERS ON PUBLIC WORKS.

PRESENTED AT THE ANNUAL CONVENTION, JUNE 29TH, 1888.

To the American Society of Civil Engineers,
Mr. JOHN BOGART, *Secretary.*

The Committee appointed by the President at the last Annual Meeting, to formulate recommendations with reference to the grades and titles of engineers on public works, after having by correspondence and otherwise made themselves acquainted with the wishes and opinions of many of the members of the Society, make the following report:

First.—That the title of Chief Engineer apply only to one having supreme direction of all engineering matters relating to the work in charge.

Second.—Whenever the work under the Chief Engineer is of such magnitude as in his opinion will not admit of his giving it proper attention in the field, or afford him sufficient opportunity to communicate with the Division Engineer or Engineers, hereinafter mentioned, then we recommend the creation of the office of Chief Assistant Engineer, who will represent the Chief Engineer in his duties, either at the chief office, or in the field.

Third.—Whenever the work in hand is of magnitude that will not permit the Chief Engineer, or his Chief Assistant, to give the proper attention and directions to the Resident Engineers, hereinafter mentioned, then we recommend the title of Division Engineer, the same to apply to one who shall act directly under and be subject to the direction of the Chief Engineer, or his Chief Assistant, in case one is required.

The duties of the Division Engineer will be to give all orders and directions to Resident Engineers, in carrying out the orders and directions conveyed to him from the Chief or Chief Assistant Engineer.

Fourth.—Resident Engineers to be considered those having direct supervision of work under progress, the extent of which should not be greater than can receive their daily supervision and examination.

Fifth.—We also recommend that the title of Assistant Engineer be applied to such other engineers as may be employed directly under the Chief, Chief Assistant, Division, or Resident Engineers in topographical work, plans of structures, or instrumental work in the field.

This title should in no way be construed as to apply to the subordinates in an engineer corps, such as rodmen, and those in an inferior position in the corps.

Sixth.—We further advise the use of the title of Locating Engineer, to apply to those having had extended experience in this most difficult and important branch of the profession, to be successful in which demands not only ability, but what may be termed genius of high order.

Seventh.—We deprecate the too frequent use of the title Consulting Engineer, by those of little experience and not acknowledged ability. We believe this title should be employed and enjoyed only by those of our profession, who, through their long and successful experience, are acknowledged authority on questions belonging to their special calling. Ordinarily, the duties of the Consulting Engineer will be confined to giving opinions, or formulating plans from facts presented, and to acting in conjunction with the Chief Engineer, or directly with the party seeking advice.

Eighth.—Engineers confining their work to special departments, and having the experience necessary to entitle such use, may well employ titles which will distinctively indicate their specialty, such as hydraulic, sanitary, electrical, etc., engineers.

Ninth.—We recommend the title Chief Engineer for the engineer having responsible charge of the public works of a city.

Tenth.—Whenever in any of the above cases the work in charge of the Chief Engineer is not of sufficient magnitude to require a Chief Assistant or Division Engineer, the Resident Engineer shall be considered as standing next to the Chief Engineer, it being understood that his duty is such that he can give personal and daily supervision to all work in his charge.

The above is respectfully submitted in the belief that we have complied with your request, in so far as it is advisable to recommend titles for present use.

D. J. Whittemore,
A. A. Robinson,
J. L. Randolph.

ADDITIONS TO

LIBRARY AND MUSEUM.

From American Institute of Mining Engineers, Dr. R. W. Raymond, Secretary. New York City:

Proceedings of the Forty-eighth Meeting, Utah and Montana, July, 1887.

Gold and Silver Mining in Utah. O. J. Hollister.

History of the Ontario Mine, Park City, Utah. Thomas J. Almy.

Notes on the Geology of Butte, Montana. S. F. Emmons.

Further Notes on the Hydrometallurgy of Copper. T. Sterry Hunt.

Engineering Relations of the Yellowstone Park. Dr. Theodore B. Comstock.

Notes on the Region North of the Vermillion Lake District, in British America. Dr. Theodore B. Comstock.

Inorganic Standards for the Colorimetric Carbon Test. Theodore W. Robinson.

The Canadian Iron Trade. James Herbert Bartlett.

The Kaiping Coal-Mine, North China. J. M. Sillman.

Proceedings of the Forty-ninth Meeting, Duluth, Minn., July, 1887.

Ore and Matte-Roasting in Utah. Richard H. Terhune.

The Old Telegraph Mine, Utah. G. Lavagnino.

Siver-Mining and Milling at Butte, Montana. William P. Blake.

Silver Ingot Melting at the Mint of the United States, at New Orleans. F. F. Claussen.

Two Conditions of Phosphorus in Iron. Second Paper. Bryon W. Cheever.

A Chrystalline Sub-Sulphide of Iron and Nickel. J. B. Mackintosh.

A New Discovery of Carbonate Iron-Ore at Enterprise, Miss. Alfred F. Brainerd.

The Resources of the Lake Superior Region. John Birkinbine.

The Chlorination of Gold-Bearing Sulphides. E. Gybbon Spilsbury.

The Rainbow Lode, Butte City, Montana. William P. Blake.

Experiments Illustrating the Descent of the Charge in an Iron Blast Furnace.

The Incline Railway at Lookout Mountain. W. H. Adams.

The Association of Minerals in the Gagnow Vein, Butte City, Montana. Richard Pearce.

The Sulphur-Deposits of Southern Utah. A. Faber Du Faur.

Silica Determinations in Blast Furnace Cinder. Clemens Jones, B. S.

Gilsonite or Unitahite; a New Variety of Asphaltum from the Unitah Mountains, Utah. Joseph M. Locke.

The Chapin Iron-Mine, Lake Superior. Per Larsson.

Wire Rope Haulage and its Application to Mining. Frank C. Roberts.

Notes on the General Treatment of the Southern Gold Ores, and Experiments in Matting Iron Sulphides. E. Gybbon Spilsbury.

American Mining Schools. Professor R. H Richards.

Microscopic Structure of Steel Rails. F. Lynwood Garrison.

Comparison of Some Southern Cokes and Iron Ores. A. S. McCreath and E. V. D. d'Invilliers.

A Water-Cooled Gas Producer. W. J. Taylor.

Note on the Formation of Coal from Mine Timber. E. S. Moffat.

Rail-Sections. W. F. Maltes.

Catalogue, List of Members, Rules, etc.

Transactions. Vol. XV, May, 1886, to February, 1887, inclusive.

From American Institute of Electrical Engineers, R. W. Pope, Secretary, New York City:

Transactions, Vol. IV., and Nos. 1, 2 and 3 Vol. V.

From Aqueduct Commissioners, New York:

Report of the Aqueduct Commissioners, from 1883 to January, 1887.

From S. G. Artingstall, Chicago, Ill.:

Three Specifications for the Construction of a Water Tunnel eight feet in diameter, from a point on the Lake Park, to be built in an easterly direction under the bed of Lake Michigan, to a distance of about four miles.

From Benjamin Baker, London:

Bridging the Frith of Forth.

From Robert Bassel, Technical Attache of the Imperial German Legation, Washington, D. C.:

Instructions as to the Inspection of Bridges of the German Government Railways (in German), Magdeberg, 1883.

From M. J. Baudry, Paris, France:

Notes sur le Service du Material et de la Traction de quelques Chemins de fer Americains. Charles Baudry. Paris, 1887.

From Commander J. R. Bartlett, U. S. N., Washington, D. C.:

Annual Report of the Hydrographer to the Bureau of Navigation for the Fiscal Year ending June 30th, 1887.

From Kgl. Regeirungs Baumeister Bassel, Technical Attache of the German Legation. Washington, D. C.:

Weber Schneeveruchungen. Bassel. Berlin, 1887.

From G. H. Benzenberg, Milwaukee, Wis.:

Annual Report of the Board of Public Works and City Engineer of the City of Milwaukee, Wis., for the year ending December 31st, 1886.

From H. Bissel, Salem, Mass.:

Fifty-fourth Annual Report of the Boston and Maine Railroad for the year ending September 30th, 1887.

From John Bogart, New York City:

Annual Report of the State Engineer and Surveyor of the Canals of New York for the Fiscal Year ending September 30th, 1885.

Annual Report of the State Engineer and Surveyor of the State of New York for the year ending September 30th, 1861.

Fourth Annual Report of the Bureau of Statistics of Labor of the State of New York for the year 1886.

From G. A. Bolrick, Boston, Mass.:

A Treatise on School Furniture; Its Construction in Compliance with Hygienic Requirements, etc. G. A. Bolrick, Boston, 1887.

From Aug. J. Bowie, Jr., San Francisco, Cal.:

Transactions of the Technical Society of the Pacific Coast for February and March, 1887.

From Bureau of Education, Washington, D. C.:

Report of the Commissioners of Education for the years 1884-85.

From Bureau of Navigation, Navy Department, Washington, D. C.:

Pilot Chart of the North Atlantic Ocean from June to December, 1887, inclusive.

From the Canadian Society of Civil Engineers, Henry T. Bovey, Secretary, Montreal, Canada:

Transactions, Vol. I, March to June, 1887; also Charter, By-Laws and List of Members.

From the Commissioners of the State Reservation at Niagara, David Gray, Treasurer and Secretary, Buffalo, N. Y.:

Supplemental and Third Annual Report of the Commissioners of the State Reservation at Niagara.

From Prof. George H. Cook, State Geologist, New Brunswick, N. J.:

Atlas Sheets Nos. 5, 10, 14 and 15 of the Geological Survey of New Jersey.

Annual Reports of the State Geologist for the years 1869, '70, '71, '72, '75 and '77.

From Hon. Washington Ford, Chief of Bureau of Statistics, Washington, D. C.:

Reports from the Consuls of the United States for 1887.

Statistical Abstract from Foreign countries for each year from 1873 to 1885. First Issue.

Index to the Consular Reports, 1880-85.

From Senor Don Francisco de Garay, Mexico, Mexico:

A Memoir of the late Captain James B. Eads, Mexico, 1887.

From Edward B. Dorsey, New York City:

Midland Railway Time Tables for July, August and September, 1887.

Time Tables of the London and Northwestern Railways and Connections.

Railway Returns for England and Wales, Scotland and Ireland for the year 1886.

English and American Railroads Compared, with Discussion. E. B. Dorsey, New York, 1887.

From J. H. Decker, Secretary American Water Works Association, Hannibal, Mo.:

Report of Proceedings of the Seventh Annual Meeting of the American Water Works Association, held at Minneapolis, Minn., July 13, 14 and 15, 1887.

From Gen. James C. Duane, Chief of Engineers, U. S. A., Washington, D. C.:

Advertisements, Proposals and Specifications, as follows:

For Removing Ledge and for Dredging in Saco River, Maine.

For Approximate Quantity of Material Required for Repair of the Pile and Piers of the Revetment at Port Clinton Harbor, Ohio.

Extending the Dike in New Haven Harbor, Conn.

For Furnishing Material at Black Lake Harbor, Mich.

For Improving New York Harbor, N. Y.

For Furnishing Material at Saugatuck, Mich.

For Dredging in Thames River, Connecticut.

For Furnishing a Tug for Use at Michigan City, Ind.

For Furnishing Material at White River Harbor, Michigan.

For Furnishing One Dredge, One Tug and Two Dump Scows, for use in improving Saint Mary's River, Michigan.

Improvement of Potomac River, near Washington, D. C.

Removal of a Wreck in Rappahannock River, Virginia.

For Hull and Upper Works for Stern Wheel Launch for the Mississippi River Commission.

For Supply of Wood and Iron.

For Furnishing Timber, Iron and Stone for Green Bay Harbor, Wis.

For Improving Maurice River, New Jersey.

For Timber, Iron and Stone, for Piers and Breakwater at Buffalo, Dunkirk, Oak Orchard, Olcott, Wilson Harbors, New York and Erie Harbor, Pa.

For Iron for Lock No. 2, Great Kanawha River, W. Va.

For Improvement of Potomac River, near Washington, D. C., Virginia Channel.

For Furnishing Rock or Stone for Work in the Atchafalaya River.

For Lock No. 8, Monongahela River.

For Removal of the Wreck of the Steam Propeller "J. J. Van Doren," now lying in Broadkiln River, Del.

For Improving Ship Channel in Galveston Bay, Texas.

For Building a Pile Dike at Saugerties Harbor, New York.

For Construction of Keeper's Dwelling, at Lock No. 4.

For Dredging in the Calumet River, "between the Forks and One-Half Mile, east of Hammond, Indiana."

For Construction of Two Dump Scows.

Improvement of Kentucky River, Kentucky, for Stone for Lock No. 6.

For Willow Brush and Piles for use at Memphis, Tenn.

For Building a Steam Snag-boat for the Improvement of the Oconee and Ocmulgee Rivers, Georgia.

For Dredging "Straight Channel," through Maumee Bay, from the Mouth of Maumee River.

For Construction of Eastern Branch Bridge, D. C.
For Materials for Wharf at Fort Monroe, Va.
For Improving Raritan Bay, New Jersey.
For Removing Ledge from Moore-a-bee Bar, near Jonesport, Maine.
For Timber for No. 2 Lock Gates, Great Kanawha River, W. Va.
For Kempe Levee and Deer Park Levee.
For Construction of Breakwater at Gorden's Landing, Lake Champlain.
For Iron Wharf at Fort Monroe, Va.
For Hull for Dredge.
For Stone, Sand, Cement and Iron.
For Furnishing Material and doing the Work of Building One Wing Dam at Whitney's Bar.
For Construction of Breakwater at Burlington Harbor, Vermont.
For the Improvement of Biloxi Harbor, Miss.
For Improving Vicksburg Harbor, Miss.
For Removing Balson's Ledge, Gloucester Harbor, Mass.
For Improving Warior River, Ala.
For the Improvement of Pascagoula River, Miss.
For Protecting the Shore of Aransas, Texas, from Erosion.
For Improving Entrance to Cross Bay, Oregon.
Report of Engineers Relative to Bridging the Arthur Kill.
Report relative to Removal of the Sand Bar Formed against the Piers of the Railway Bridge across Red River, at Shreveport, Louisiana.
Annual Report upon the Improvement of certain Rivers and Harbors in Maryland, Virginia, and North Carolina.
Annual Report of the Missouri River Commission, together with Appendices A and B, for the Fiscal Year ending June 30th, 1886.
A list of the names and places of residence of Civil Engineers employed on works of River and Harbor Improvement.
A Communication from the Mississippi River Commission, in reference to the Works of Protection to the Banks of that River; also to the failure to make provision for the expenses of the Commission.
A Resolution of the Board of Managers of the Lake Carriers' Association of Buffalo, N. Y., favoring the acquisition by the United States of the Sturgeon Bay and Lake Michigan Ship Canals.

From H. A. Duc, Charleston, S. C.:
A Descriptive Narrative of the Earthquake of August 31st, 1886, with Notes of Scientific Investigations. Carl McKinley, Charleston, 1887.
Year Book of City of Charleston, South Carolina, 1886.

From Dyckerhoff and Söhne, Amöneburg, Germany:
Protokol der Verhandlungen des Vereins deutscher Cement-Fabrikanten und der Section für Cement des Deutschen Vereins für Fabrikation von Ziegeln, Thonwaaren, Kalk und Cement, am 25 und 26 Februar, 1887. Berlin, 1887.

From *Engineering*, London, England:
A Treatise upon Cable or Rope Traction as Applied to the Working of Street and other Railways. J. Bucknall Smith, London, 1887.

From B. E. Fernow, Chief of Forestry Division, Washington, D. C.:
Report on the Relation of Railroads to Forest Supplies and Forestry, together with Appendices.

From Desmond FitzGerald, Brookline, Mass.:
Report on the Capacity of the Sudbury River and Lake Cochituate Water Sheds in Time of Drought.

From A. D. Foote, Boise City, Idaho:
Report on the Irrigating and Reclaiming of Certain Desert Lands in Idaho, and other Projects connected therewith. A. D. Foote, New York, 1887.

From M. N. Forney, New York City:
Annual Reports of the Master Car Builders Association for the years 1867, '68, '69, '70, '71, '72, '74, '75, '77, '78, '79, '80, '81 and '86.

From Le Marquis de Galigny, Versailles, France:
Recherches Theoriques et Experimentales sur les Oxellation de l'Eau et les Machines Hydrauliques a Colonnes Liquides Oscillantes Archuit Planches. Parte Premiere, and Seconda, par Le M. Anotete de Galigny, Paris, France, 1883.

From C. C. Gilman, Chicago, Ill.:
Facsimile of United States Patents issued to Charles Caroll Gilman, Protecting their Manufacture and Application for Architectural and Specific Uses, 1887.

From John L. Gill, Jr., Philadelphia, Penn.:
Screw Threads.

From William Hamilton, Toronto, Canada:
Annual Report of the Superintendent of the Toronto Water Works for the year ending 31st December, 1886.

From Albert B. Hill, New Haven, Conn.:
Annual Reports of the Department of the Board of Public Works, City of New Haven, Conn., for the year 1886.

From W. H. Hitchcock, New York City:
Railroad Gazette, June 28, July, August, September, October 4, 1878, and January 18, 1884.

From William A. Ingham, Secretary Board of Commissioners Second Geological Survey of Pennsylvania:
Annual Report of the Geological Survey of Pennsylvania for 1886. Part I, Pittsburgh Coal Region.

From Institution of Civil Engineers, James Forest, Secretary, London:
Experiments on the Strength of Iron and Steel in Shear and Tension. John Platt and Robert Francis Hayward.
On the Removal of Sand from Underneath the Liverpool Landing Stage. William Henry Le Mesuvier.
The Use of Cast-steel in Locomotive Engines. Alfred John Hill.
Notes on the Detection of Leaks in Water Mains. New River Company, Joseph Frances. East London Water Works Company, William Booth Bryan. Grand Junction Water Works Company, Alexander Fraser. Southwork and Vauxhall Water Company, James William Restler.
River Tees Improvements. John Fowler.

The Lumber Industry of Ontario. Matthew Joseph Butler.
Flerio-Mills and their Machinery. Alfred Chatterton.
The Sinking of Two Pits at Gueisenau, Dortmund. H. Tomson.
South African Rivers South of the Orange and Vaul. William Blomefield Tripp.
On the Extension of the Ceylon Government Railway from Nawalopitiya to Nanu Oya. Francis John Waring.
Abstract of Papers in Foreign Transactions and Periodicals.
Dredging Operations and Appliances. John James Webster (with an abstract of the Discussion upon the paper).
The Moltens Reservoir. Charles John Wood.
Recent Researches in Friction, Part II. John Goodman.
Gas Power Compared with Steam Power. Joseph Emerson Dorson.
Water Supply in Cape Colony. John George Gamble.
On the Manufacture of Salt near Middlesbrough. Sir Lowthian Bell (with an abstract of the Discussion upon the paper).
The Conversion of Timber by Circular-saws and by Band-saws in the Pine Growing Districts of the United States of America. Lewis Henry Ransome (with an abstract of the Discussion upon the paper).
Water Supply from Wells, comprising the following papers:
I.—Chuck Springs in the London Basin. Illustrated by the Newbury, Workingham, Leatherhead and Rickmansworth Water Works. John William Grovers.
II.—Borings in the Chalk at Bushey, Herts. William Fox.
III.—On a Bore Hill in Leicestershire. Thomas Sullock Stooke.
IV.—The Wells and Borings of the Southampton Water Works. William Matthews (with an abstract of the Discussion upon the papers).
Printing Machinery. Edward Amott Clowers (with an abstract of the Discussion upon the paper).
The Treatment of Gun Steel Coal. Eardley Maitland (with an abstract of the Discussion upon the paper).
The Yanegase Yama Tunnel on the Touruga Nagahame Railway, Japan. Knishe Hasegana.
Discharge of Water Over Weirs. Charles Slagg.
Notes upon Railway Construction in the River Plata, Argentine Republic. Thomas Holmes Perry.
Minutes of Proceedings, Vol. LXXXIX, Session 1886-87, Part III.
Vol. XC, 1886-87, Part IV.
Brief Subject Index, Vols. LIX to XC.
Charter, Supplement Charter, By-Laws, and List of Members, August 3d, 1887.

From Institution of Engineers and Shipbuilders in Scotland. W. J. Millar, Secretary, Glasgow, Scotland:
Transactions, Vol. XXX, 1886-87.

From J. B. Johnson, St. Louis, Mo.:
The Theory and Practice of Surveying. J. B. Johnson, New York, 1887.

From John Kennedy, Montreal, Canada:
Annual Reports of the Harbor Commissioners of Montreal for the year 1886.

From Louis H. Knapp, Buffalo, N. Y.:
Eighteenth Annual Report of the Buffalo City Water Works for the year 1886.

From Albert Krause, Buffalo, N. Y.:
Annual Report of the City Engineer of Buffalo, New York, for the year 1886.

From Lehigh Valley Creosoting Works, Perth Amboy, N. J.:
Four Photographs of Lehigh Valley Creosoting Works, Perth Amboy, N. J.

From E. N. Lewis, Manager Official Railway List, Chicago, Ills.:
The Official Railway List for 1888.

From Liverpool Engineering Society, Thomas L. Miller, Secretary, Liverpool, Eng.:
Annual Report and Statement of Accounts for 1886. Rules of the Society and List of Members.

From Arthur Marichal, Philadelphia, Penn.:
The Gileppe Dam. Synopsis of a Description and Discussion.
Blue Print on the Construction of Reservoir Walls.

From the Maverick National Bank, Boston, Mass.:
The Maverick National Bank Manual for July 1st, 1887.

From Mansfield Merriman, Bethlehem, Pa.:
A Text Book on Roofs and Bridges. Part I. Stresses in Simple Trusses. Mansfield Merriman, New York, 1887.

From Henry C. Myer, New York City:
Water Waste Prevention; Its Importance and the Evils Due to Neglect. Henry C. Meyer, New York, 1885.

From George S. Morison, New York City:
Tenth Census of the United States, Vol. XV.

From Gilbert Murdoch, St. John, N. B., Canada:
Annual Accounts and Statements, with Superintendent's and Auditor's Reports of Sewerage and Water Supply for the City of Saint John (East-side) and Town of Portland, for the year ending December 31st, 1886.

From New York Meteorological Observatory, Department of Public Parks. Dr. Daniel Draper, Director, New York City:
Abstracts of Registers from Self-recording Instruments. May, June, July, August, September, October, November and December, 1887, and Annual Report for the year ending December 31st, 1886.

From Professor Simon Newcomb, U. S. Navy, Superintendent, Washington, D. C.:
The American Ephmeris and Nautical Almanac for the year 1890. First Edition.

From John Neuman, London, England:
Notes on Concrete and Works in Concrete. John Neuman, London, 1887.

From New York Library Club:

Union List of Periodicals currently received by the New York and Brooklyn Libraries. New York, 1887.

From E. P. North, New York City:

Speech of Hon. Warner Miller, of New York, on Internal Improvements; their Value to the Country, and to the Individual Farmer and Laborer.

Annual Report of the State Geologist of New Jersey for the year 1883.

Annual Report of the Chief Engineer of the Philadelphia Water Department for the year 1883.

Communication from Board of Health Relative to the Condition of the New Aqueduct, New York.

The Design Generally of Iron Bridges of Very Large Span for Railway Traffic. Thomas Curtis Clarke.

Lancaster Water Works Extension. James Manreigh.

Dredging and other Plant employed at the Quebec Harbor Works. St. George James Boswell.

The Design and Construction of the South Reserve Piers and Floating Landing Stage at Birkenhead. Charles Graham Smith.

Deep Mining of Coal in South Wales. T. Foster Brown and G. F. Adams.

On the Sinking of Two Shafts at Mandew for the Whitburn Coal Company. John Daglish.

On the Diamond Fields and Mines of Kimberley, South Africa. James Noah Paxman.

Report of the Department of Public Works of the City of New York for the quarters ending March 31st, June 30th, September 30th and December 31st, 1882–1883, 1884 and 1885.

First Annual Report of the Department of Public Works of the City of Chicago for the Fiscal Year ending December 31st, 1876.

From Osgood Dredge Company Albany, N. Y.:

Seven Framed Photographs of Dredges.

From A. B. Paine, Poughkeepsie, N.Y.:

Six Photographs of Progress of Construction of Poughkeepsie Bridge.

From G. W. Pearsons, Kansas City, Mo.:

Three Photographs of Kansas City Water Works.

From Captain A. E. Piorkowski:

Gruson's Chilled Cast-Iron Armor. Julius von Schütz. London, 1887.

From E. Poutzen, Paris, France:

Observations de M. E. Poutzen en répouse au Rapport de M. Durand Claye au Sujet du Systeme-Waring. Vienne, 1887.

La Traversée des Alpes par le Chemin de Fer du Simplon. R. Gentilini. Paris, 1886.

Les Voris de Communication en Cochin-China. R. Gentilini. Paris, 1886.

From the Pratt and Whitney Co., Hartford, Conn.:

Standards of Length and other Practical Applications.

From Charles E. Pugh, Philadelphia, Penn:

Fortieth Annual Report of the Board of Directors of the Pennsylvania Railroad Company to the Stockholders. Presented at the Meeting held November 8th, 1887

From George W. Rafter, Rochester, N. Y.:

On the Use of the Amplifier, with Observations on the Theory and Practice of Photo-Micrography suggested by the Design of a New Photo-Micro Camera.

From Railroad Commissioners of Massachusetts:

Special Report by the Massachusetts Board of Railroad Commissioners in Relation to the Disaster on Monday, March 14, 1887, on the Dedham Branch of the Boston and Providence Railroad.

From Railroad Commissioners of the State of New York:

Fourth Annual Report of the Board of Railroad Commissioners of the State of New York for the Fiscal Year ending September 30th, 1886. Vols. I and II.

From H. B. Roosevelt. President Shell Fish Commission, New York City:

Second Report of the Oyster Investigations and of Survey of Oyster Territory for the years 1885 and 1886. Eugene G. Blackford, Albany, 1887.

Report of the Commissioners of Fisheries of the State of New York in charge of the Oyster Investigation.

From Hon. Senor Romero, Mexican Minister to the United States, New York City.

The Organization and Management of Public Libraries. William F. Poole, Chicago, Illinois.

Statistics of Public Libraries in the United States.

Reports of the Committee of Investigation sent in 1873 by the Mexican Government to the Frontier of Texas. New York, 1875.

The Republic of Mexico in 1876. Antonio Garcia. Cubas, Mexico, 1876.

From Leo von Rosenberg, New York City:

The Vosburg Tunnel. A Description of its Construction. Illustrated. Leo von Rosenberg, New York, 1887.

From J. F. L. Schneider, Secretary Polytechnique School, Delft:

Annales de L'Ecole Polytechnique de Delft. Nos. 1, 2, 3 and 4, 1885; No. 1, 1886, and Nos. 1, 2, 3 and 4, 1887.

From Collingwood Schreiber, Ottawa, Canada:

Annual Report of the Minister of Railways and Canals, for the Fiscal Year from 1st July, 1885, to 30th June, 1886.

Railway Statistics of Canada for 1886, with Map showing the Railways of Canada to accompany Annual Report on Railway Statistics.

From William P. Shinn, Boston, Mass;

Twelfth Annual Report to Stockholders of the New York and New England Railroad Company, made at the Annual Meeting, Tuesday, December 13th, 1887.

From W. F. Shunk, New York City:

Memorial of Colonel James Worrall, Civil Engineer, with an Obituary Postscript, by a Friend.

From R. E. Smiley, Watertown, N. Y.:
Annual Reports of the Board of Directors of the Rome, Watertown and Ogdensburg Railroad Company for the Fiscal Years 1883–84 and 1886, and Supplementary Report, June 1st 1884.

From Oberlin Smith, Bridgeton, N. J.:
If Material Why Moral?

From Smithsonian Institution, Washington, D. C.:
Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures and Conditions of the Institution to July, 1885.

From Samuel Spencer, Baltimore, Md:
Service Report on Technical Education, with Special Reference to the Baltimore and Ohio Railroad Service. Dr. W. T. Barnard, Baltimore, 1887.

From Professor George F. Swain, Boston, Mass.:
Abstract of the Proceedings of the Society of Arts, with List of Officers and Members of the Twenty-fifth Year, 1886–87.

From W.R. Taylor, Philadelphia, Penn.:
Annual Reports of the P. and R. R. R. for the years 1870 to 1886, inclusive; also Statement of the present condition of the P. and R. R. R. and the P. and R. Level Iron Company, with Plans for their Financial Reorganization. Franklin B. Gowen, President.

From John Thomson, New York City:
The Thomson Water Meter.

From Ernest Toeche. Berlin, Germany:
Eisen und Eisenkonstruktionen. Part I. G. Mehrtens, Berlin, 1887.

From Henry R. Towne, Stamford, Conn.:
Album of Crane Designs.

From John C. Trautwine, Jr., Philadelphia, Penn.:
Trautwine's Civil Engineer's Pocket Book. New Edition. 1887.
The Field Practice of Laying Out Circular Curves for Railroads. New York, 1887.
A Method of Calculating the Cubic Contents of Excavations and Embankments by the aid of Diagrams, together with Directions for Estimating the Cost of Earthwork. John C. Trautwine. New York, 1887.

From S. E. Tinkham, Secretary Boston Society of Civil Engineers, Boston, Mass.:
Constitution and By-Laws and List of Members. September, 1887.

From B. G. Underwood, New York City:
The Scientific American Supplement. New Catalogue of Valuable Papers.

From United States Geological Survey, Washington, D. C.:
Sixteen Atlas Sheets of the United States Geological Survey.
Sixth Annual Report of the United States Geological Survey for the years 1884–85. J. W. Powell, Washington, D. C., 1885.
Geology and Mining Industry of Leadville. S. E. Emmons.
Mineral Resources of the United States. 1886.
Bulletin of the United States Geological Survey, Nos. 34, 35, 36, 37, 38 and 39.

From U. S. Naval Observatory, Washington, D. C.:
Observations made during the year 1883 at the United States Naval Observatory.

From Robert Van Buren, Brooklyn, N. Y:
Annual Report of the Department of City Works of Brooklyn for the year 1886.

From Harry L. Van Zile, Albany, N.Y.:
The Heine Safety Boiler.

From Prof. J. A. L. Waddell, Kansas City, Mo.:
General Specification for Highway Bridges of Iron and Steel. J. A. L. Waddell, Kansas City, 1887.

From Arthur M. Wellington, New York City:
The Economic Theory of the Location of Railways. A. M. Wellington, New York, 1887.

From S. S Wheeler, New York City:
One Framed Chart of Wire Gauges.

From Frederick N. Willson, Princeton, N. J.:
A Completed Nomenclature for the Principal Roulettes. Frederick Newton Willson, New York, 1887.

From O. S. Wilson, Kenka, N. Y.:
The Final Results of the Triangulation of the New York State Survey, with Eleventh Annual Report of the Commissioners of the Survey.

From other sources:
Memoir of James Buchanan Eads.
Tehuantepec Ship Railway. Answer of James B. Eads correcting the Erroneous Statements of the Promoters of the Nicaragua Canal Scheme.
Concession from the Mexican Government to James B Eads for the Construction of a Ship Railway across the Isthmus of Tehuantepec, May 28th, 1881. St. Louis, 1881.
Contract and Specifications for Building an Iron Pier at Marine Park for the Department of Parks of the City of Boston. June, 1887.
The Lamb Prize Essays of the American Public Health Association. An Appendix. Second Edition. Concord, N. H., 1886.
The Russian Petroleum Industry B-Redwova. Manchester, 1885.
Shall the Erie Canal Look to the Federal Government for its Support, as advocated by the Republican Platform? G. Bleecker Miller. New York, 1887.
The State's Canal Policy. Hon. William M. Evarts.
The Railways of Brazil. John C. Brainard. Chicago, 1887.
Williams' Estate, Description and Advantages.
Physiographical Map of North Carolina.
Report of the Committee on Over-head Wires to the Board of Electrical Control.
Robinson's Atlas of the City of New York.
Proceedings of the Association of Dominion Land Surveyors at its Fourth Annual Meeting, held at Ottawa, Canada, March 8th and 9th, 1887.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BALDWIN, WILLIAM JAMES	86 Fulton st., New York City	Sept. 5, 1888
CODWISE, EDWARD BERTIE	Chief Engineer Ulster and Delaware R'y, Kingston, N. Y.	Sept. 5, 1888
CURTIS, WALTER WHALEY	560 Drake Block, St. Paul, Minn.	Sept. 5, 1888
HERBERT, ARTHUR POWIS	Mexican National Construction Co., Ortega 28, Mexico, Mexico	Sept. 5, 1888
MAGUIRE, EDWARD	Captain Corps of Engineers, Willetts Point, N. Y.	Sept. 5, 1888
MASON, ARTHUR JOHN	1423 Jefferson st., Kansas City, Mo.	Sept. 5, 1888
SCHERZER, WILLIAM	159 Home Insurance Building, Chicago, Ill	Sept. 5, 1888
WIGHTMAN, WILLARD HUMPHREY	Assistant Engineer Spokane and Palouse R'y, Genesee, Idaho	Sept. 5, 1888

ASSOCIATE.

GIBSON, WILLIAM, Jr	84 Fulton st., New York City	Sept. 5, 1888

JUNIORS.

CLARKE, ST. JOHN	(Care Hoffman & Bates), Portland, Ore	Sept. 5, 1888
GAHAGAN, WALTER H.	Troy, Ohio	Sept. 5, 1888
PRATT, MASON DELANO	Box 1003, Johnstown, Pa	Sept. 5, 1888

FELLOW.

GREEN, SAMUEL MAGEE	81 New Insurance Building, Milwaukee, Wis	Sept. 5, 1888

CHANGES AND CORRECTIONS.

MEMBERS.

APPLETON, ELLERY C.....Steep Creek, Strait of Canso, Nova Scotia.
BAKER, WILLIAM H.....Fitchburg, Mass.
BALDWIN, FRED. H.....(Care Chelsea Jute Mills), Fifteenth avenue and Twenty-fifth st., New York City.
BARNARD, AUGUSTUS P.....White City, Morris Co., Kans.
BERRIAN, RICHARD M.....255 West One Hundred and Twenty-eighth st., New York City.
CROWELL, J. FOSTER.....P. O. Box 1014, Geneva, N. Y.
DAGRON, JAMES G.....415 Broadway, New York City.
ENGLE, ROBERT L.....9 Hackberry st., Walnut Hills, Cincinnati, Ohio.
FILLEY, HIEL H.....1326 Forest avenue, Kansas City, Mo.
GIELOW, HENRY J.....992 Fourth avenue, Brooklyn, N. Y.
GRISWOLD, FRANK L.....451 Reconquista, Buenos Ayres, Argentine Republic.
HENNY, DAVID C.....Watertown, Dakota.
HINCKLEY, JOHN F.....Chief Engineer St. Louis, Arkansas and Texas Ry., 2017 Rutgers st., St. Louis, Mo.
HOUSTON, JOHN.....1659 Lexington avenue, New York City.
HUDSON, JOHN R.....Box 42, Pomona, Cal.
HUNT, RANDALL.....San Francisco Contracting Co., 6 California st., San Francisco, Cal.
LE BARON, J. FRANCIS.....First Assistant Engineer in charge Expedition, Nicaragua Canal Construction Co., Greytown, Nicaragua, Central America.
LEDERLE, GEORGE A.....(Care Oregon Ry. and Navigation Co.), Riparia, Wash.
LUTZ, ULYSSES S.....Holmesburg, 23d Ward, Philadelphia, Pa.
MAIS, HENRY C.....Consulting Engineer, 29 Queen st., Melbourne, Victoria, Australia.
MARR, GEORGE A.....U. S. Engineer's Office, 1415 Washington ave., St. Louis, Mo.
MORRIS, MARSHALL.....530 West Walnut st., Louisville, Ky.
NEWMAN, ROBERT M.....415 W. Franklin st., Jackson, Mich.
PURDON, CHARLES D.....Louisville and Nashville Ry., Roost P. O., Bell Co., Ky.
SHAILER, ROBERT A.....(Shailer & Schniglau), 609 Phenix Building, Chicago, Ill.
SHANLY, JAMES M.....1251 Dorchester st., Montreal, Canada.
SIMPSON, GEORGE F.....P. O. Box 2, Yonkers, N. Y.
SNOW, J. PARKER.....Engineer's office, Boston and Maine R. R., Boston, Mass.
SONNE, OTTO F.....U. S. Engineer's office, Kansas City, Mo.
VAN BROCKLIN, MARTIN.....Elizabeth, Lincoln Co., Neb.
WALLACE, JOHN F.....Keithsburg, Ill.

WHEELER, LEVI L.....Lock Box 132, Chicago, Ill.
WILLIAMSON, WM. GARNETT.....723 Monroe st., Montgomery, Ala.
WISNER, GEORGE Y.....Port Eads, La.

JUNIORS.

BUTTS, ELIJAH P.....Assistant Engineer, Snake River Bridge, Riparia, Wash.
GOLDSMITH, NATHANIEL O.....The Weir Frog Co. (Residence, 65 East Fourth st.), Cincinnati, Ohio.
HORTON, SANDFORD.....Niobrara, Knox Co., Neb.
RAASLOFF, HAROLD E. DE..... (Care Frazar & Co.), Yokohama, Japan.
TAPPAN, ROGER.....163 West Twenty-third st., New York City.

DEATHS.

HARBAUGH, SPRINGER.....Elected Fellow May 19, 1871; died December 8, 1887.
RANDOLPH, JAMES L.....Elected Member March 1, 1882; died September 17, 1888.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—October, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

OCTOBER 3D, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: William Barker Landreth, Schenectady, N. Y.; Charles Levings, Chicago, Ill.; Charles Abbott Locke, Nashville, Tenn.; Gouverneur Morris, Ardsley, N. Y.; George Thomas Nelles, Leavenworth, Kan.; Frank Chittenden Osborn, Pittsburgh, Pa.; Charles Francis Powell, St. Louis, Mo.; Nathaniel Edwards Russell, Lansingburg, N. Y.; Isaac Austin Smith, Lebanon, Ill.; Linton Waddell Stubbs, Monroe, La. As Juniors: Toragoro Kondo, Kansas City, Mo.; Frank Parsons Lant, New York City; Thomas Kennard Thomson, Pencoyd, Pa.

The Secretary announced the election to Fellowship, on September 5th, 1888, of Samuel Magee Green, of Milwaukee, Wis.

The death, on September 17th, 1888, of James L. Randolph, M. Am. Soc. C. E., was announced.

A paper by John A. Bensel, Jun. Am. Soc. C. E., on "The New Transfer Bridge at Harsimus Cove, Jersey City, N. J.," was read by the author and discussed by Messrs. Croes, John Bogart, Cooper and Bensel.

A paper by G. W. Cooley, M. Am. Soc. C. E., on "Experiments on the Stability of Bench Marks," was read by the Secretary and discussed

by Messrs. Croes, John Bogart, Skinner, Odell, Fteley, H. W. Brinckerhoff and Brendlinger.

A written discussion on the paper by Col. Wm. P. Craighill, M. Am. Soc. C. E., on "Some Observations on the Improvement of Several of the Rivers of the Atlantic Coast," by C. P. E. Burgwyn, M. Am. Soc. C. E., was read by the Secretary.

OCTOBER 17TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

The report of the Nominating Committee was read, as follows:

NEW YORK, October 10th, 1888.

To the Board of Direction,

AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN,—In accordance with Article 3d, Section 24 of By-Laws, the Nominating Committee appointed at the last Annual Convention, present the names of persons selected by them as candidates for Officers: For President, M. J. Becker, Pittsburgh, Pa.; Vice-President, A. Fteley, New York City; Vice-President, E. L. Corthell, Chicago, Ill.; Treasurer, George S. Greene, Jr., New York City; Secretary, John Bogart, New York City; Directors, Charles B. Brush, Hoboken, N. J.; Eliot C. Clarke, Boston, Mass.; Walter Katté, New York City; Robert E. McMath, St. Louis, Mo.; William P. Shinn, New York City.

Yours respectfully,

WILLIAM G. HAMILTON,
WILLIAM B. KNIGHT,
A. DEMPSTER,
A. B. ROGERS,
F. P. STEARNS,
Nominating Committee.

A paper by James D. Schuyler, M. Am. Soc. C. E., on "The Construction of the Sweetwater Dam," was read by the Secretary and discussed by Messrs. James B. Francis, H. W. Brinckerhoff, John Bogart, Wegman, W. B. Parsons, Croes, Buck, Fteley, Comstock, Striedinger, Hunt, and Brush.

OF THE BOARD OF DIRECTION.

OCTOBER 4TH, 1888.—Appropriations made. Applications considered. Nominations as Honorary Members of William J. McAlpine, Julius W. Adams and George S. Greene were presented. Financial business transacted.

LIST OF MEMBERS.

ADDITIONS.

HONORARY MEMBERS.

		Date of Election.
ADAMS, JULIUS W.*	(*Past President.*) Consulting Engineer Dep't Public Works, 31 Chambers st., New York City	Oct. 26, 1888
GREENE, GEORGE SEARS*	(*Past President.*) 31 Boyken st., Morristown, N. J	Oct. 26, 1888
MCALPINE, WILLIAM JARVIS†	(*Past President.*) New Brighton, Richmond Co., N. Y	Oct. 26, 1888

MEMBERS.

FISHER, EDWIN AUGUSTUS	208 Troup st., Rochester, N. Y.	July 4, 1888
LOCKE, CHARLES ABBOTT	U. S. Engineer's office, Nashville, Tenn	Oct. 3, 1888
NELLES, GEORGE THOMAS	City Engineer, Leavenworth, Kans	Oct. 3, 1888
OSBORN, FRANK CHITTENDEN	Hamilton Building, Pittsburgh, Pa	Oct. 3, 1888
STUBBS, LINTON WADDELL	Resident Engineer Vicksburg, Shreveport and Pacific R. R., Monroe, La	Oct. 3, 1888

JUNIORS.

FUERTES, JAMES HILLHOUSE	520 River st., Wichita, Kans	May 2, 1888
KONDO, TORAGORO	118 West Sixth st., Kansas City, Mo	Oct. 3, 1888
LANT, FRANK PARSONS	252 West One Hundred and Thirty-third st., New York City	Oct. 3, 1888
WILLIAMS, WILLIAM PLUMB	Victoria Hotel, New York City	May 4, 1887

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

DUANE, JAMES C	President Aqueduct Commission, 215 Stewart Building, New York City.

* Elected Member Nov. 5th, 1852. † Elected Member Feb. 2d, 1853.

CORRESPONDING MEMBER.

PONTZEN, ERNEST.....3 Avenue du Coq (89 rue St. Lazare), Paris, France.

MEMBERS.

AULLS, HERBERT L.....Room 33, Pioneer Building, Denver, Colo.
BASSEL, ROBERT.....81 Bülow st., Berlin, W., Germany.
BLACK, WILLIAM M.....Captain Corps of Engineers U. S. A., Room 20, Fourth Floor, P. O. Building, Philadelphia, Pa.
BUTTERFIELD, FRANCIS E.....(Care B. Hebard), Bracketville, Kinney Co., Texas.
CISNEROS, FRANCIS J.....Barranquilla, U. S. Colombia.
DARRACH, CHARLES G.....(Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
GODWIN, BRYANT.....54 Frankfort st., New York City.
GREENE, BENJAMIN D.....2 East Fifteenth st., New York City.
HARLOWE, CHARLES.....Duluth and Winnipeg R'y, Box 357, Cloquet, Minn.
HILLMAN, CHARLES F.....Civil Engineer, Box 185, Santiago, Chili.
JENNINGS, HENRY C.....Room 28, Barclay Block, Denver, Colo.
McDONALD, HUNTER.....Engineer in charge Nashville, Chattanooga and St. Louis R'y, Lewisburgh, Marshall Co., Ky.
MORSE, CHARLES J.....Platoro, Conejos Co., Colo.
OCKERSON, JOHN A.....Vice-President and Manager Silver Age Mining and Milling Co., Idaho Springs, Colo.
PLAYLE, EDWARD F.....Hotel Winthrop, Seventh ave. and One Hundred and Twenty-fifth st., New York City.
POU, ARTHUR.....Chief Engineer Alabama Midland R'y, Bainbridge, Ga.
RICHARDSON, B. FRANK.....Division Engineer Baltimore and Ohio R. R., 2126 Wharton st., Philadelphia, Pa.
RUMBLE, WILLIAM.....(Care Hudson Suspension Bridge and New England R.R.), 38 Wall st., New York City.
SEAMAN, HENRY B.....(Care Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
TALCOTT, THOMAS M. R.....First Vice-President Richmond and Danville R. R., Richmond, Va.
VANCE, HART.....120 W. Chestnut st., Louisville, Ky.
WETHERILL, WILLIAM C.....(Care King & Wetherill), Winchester, Frederick Co., Va.
WHEELER, ORLANDO B.....1415 Washington av., St. Louis, Mo.
WILSON, HENRY W.....Civil Engineer, Drexel Building, Philadelphia, Pa.
WILSON, JOHN A.....Civil Engineer, Drexel Building, Philadelphia, Pa.

WILSON, JOSEPH M.....Civil Engineer and Architect, Drexel Building, Philadelphia, Pa.

JUNIORS.

BELL, GILBERT J.....Keithsburg, Ill.
BOOKER, BERNARD F.....Assistant Engineer Maintenance of Way Gulf, Colorado and Santa Fé R'y, Galveston, Texas.
CLARKSON, ROBERT C.....(Care Wilson Bros. & Co.), Drexel Building, Philadelphia, Pa.
HASBROUCK, CHARLES A.....(Care Chicago Forge and Bolt Co.), Chicago, Ill.
HOWE, HORACE J.....(Care New York, Lake Erie and Western R. R.), Susquehanna Pa.
NOYES, ELLIS B.....Assistant Engineer in Charge New York State Canals, Fort Edward, N. Y.
POTTER, ALEXANDER.....Lehigh University, South Bethlehem, Pa.
SMITH, MAXWELL.....(Care Keep Mfg. Co.), 809 Broadway, New York City.
YATES, PRESTON K.....Atlanta, Ga.
YOUNG, HERBERT A.....(Care Edward H. Whorf), San Luis Potosi, Mexico.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—November, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

NOVEMBER 7TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates declared elected. As Members: Jacob Neff Barr, Milwaukee, Wis.; Carrol Phillips Bassett, Newark, N. J.; William Cain, Charleston, S. C.; William Crawford, Sault Ste. Marie, Canada; George Blinn Francis (elected Junior September 5th, 1883), Providence, R. I.; Henry Newton Francis (elected Junior March 1st, 1876), Providence, R. I.; James Walter Grimshaw, Sydney, Australia; George Richardson Hardy, New Haven, Conn.; Franklin Riffle, Wallula, Washington Territory; Benjamin Burgh Smith, Charleston, S. C.; Frank Sherman Washburn, Chicago, Ill.

The Secretary announced the transfer to Honorary Membership of the following Past Presidents: Julius W. Adams, William Jarvis McAlpine and George Sears Greene.

The Committee appointed at the last Convention to consider a resolution offered by the Special Committee on Uniform Standard Time, and report to a subsequent meeting, made the following report:

November 3, 1888.

To the American Society of Civil Engineers:

At the meeting at Milwaukee, June 29th, 1888, there was proposed and committed to Fred. Brooks and Percival Roberts, Jr., for report at a subsequent meeting, the following resolution:

"*Resolved*, That in accordance with the recommendation contained in the Report of the Committee on Standard Time, the Treatise on Time and Its Notation be brought to the notice of the Bureau of Education,

with the request that it be widely disseminated for the use of the schools of the United States, and that the Superintendents of Education be invited to enjoin teachers to give special lectures and lessons on the subject to the pupils attending the schools, and that such other means be taken as may be deemed best to attain the object aimed at by the report of the Committee."

Messrs. Brooks and Roberts, Committee, think it beyond the province of the Society to urge the dissemination of one specified treatise for the use of schools, or the enjoining of a particular method of common school instruction, as by "special lectures and lessons;" and have to recommend that the resolution proposed, as above stated, be not adopted.

Respectfully submitted by

FRED. BROOKS,
For the Special Committee.

This report was, on motion, accepted and its recommendation adopted.

The report of the Committee on the Proper Relation to each other of the Sections of Railway Wheels and Rails was discussed.

A paper on "Time Reform," by Fred. Brooks, M. Am. Soc. C. E., was read by the Secretary.

Mr. E. A. Giesler explained a method of determining angles of railroad turnouts.

NOVEMBER 21ST, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

A paper on "The Construction of the Bridge over the Arkansas River, at Van Buren, Ark.," by C. D. Purdon, M. Am. Soc. C. E., was read by the Secretary, and discussed by Messrs. Charles Macdonald, Sooysmith, Collingwood, H. W. Brinckerhoff, Flagg, John Bogart, T. C. Clarke, Croes, and J. P. Davis.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BARR, JACOB NEFF	Superintendent of Motive Power, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis.	Nov. 7, 1888

BASSETT, CARROL PHILLIPS.....Cor. Broad and Market sts., Newark, N. J..... Nov. 7, 1888
CAIN, WILLIAM.....Citadel, Charleston, S. C..... Nov. 7, 1888
CRAWFORD, WILLIAM.....Sault Ste. Marie, Ontario, Canada..... Nov. 7, 1888
FRANCIS, GEORGE BLINN.....(Elected Junior, September 5, 1883), Assistant Engineer New York, Providence and Boston R. R., Providence, R. I..... Nov. 7, 1888
FRANCIS, HENRY NEWTON.....(Elected Junior, March 1, 1876), Assistant Engineer, City Engineer's office, Providence, R. I..... Nov. 7, 1888
GRIMSHAW, JAMES WALTER.....109 Lansdowne road, Kensington Park, London, England. Nov. 7, 1888
LUNDIE, JOHN.....Assistant City Engineer, City Hall, Chicago, Ill..... July 4, 1888
MORRIS, GOUVERNEUR.....Getty House, Yonkers, N. Y... Oct. 3, 1888
RIFFLE, FRANKLIN.....Engineer Oregon and Washington Territory Ry., Wallula, Wash..... Nov. 7, 1888
RUSSELL, NATHANIEL EDWARDS..Trenton, N. J..... Oct. 3, 1888
SMITH, BENJAMIN BURGH.....5 Southern Wharf, Charleston, S. C..... Nov. 7, 1888
WASHBURN, FRANK SHERMAN....Union Stock Yards, Chicago, Ill..... Nov. 7, 1888

JUNIOR.

THOMSON, THOMAS KENNARD....Bridge Department, Pencoyd Iron Works, Pencoyd, Pa.... Oct. 3, 1888

CHANGES AND CORRECTIONS.

ANDREWS, JOHN W.....Chief Engineer Columbus, Ft. Wayne and Western Ry., Covington, Ky.
BARNARD, AUGUSTUS P.....D. K. E. Club, 435 Fifth ave., New York City.
BRENDLINGER, P. F.....79 Warburton ave., Yonkers, N. Y.
BROWN, THOMAS E., JR.....(Care Otis Bros. & Co.), 38 Park row, New York City.
CHURCH, BENJAMIN S.....Consulting Engineer New Croton Aqueduct, Room 213, Stewart Building, New York City.
DAGRON, JAMES G.....415 Broadway, Room 30, New York City.
EVANS, LOUIS P.....(Cofrode & Evans, Engineers and Contractors) Pottstown, Pa.

FLAD, EDWARD.....Assistant Engineer Board of Water Supply Commission, 312 Central ave., Cincinnati, Ohio.
FTELEY, ALPHONSE.....Chief Engineer New Croton Aqueduct, Room 215, Stewart Building, New York City.
GRANT, WILLIAM H.....3107 N. st., Georgetown, D. C.
HARLOWE, CHARLES.....1417 Sixth st., S. E., Minneapolis, Minn.
HAVEN, WILLIAM A.....Chief Engineer Northern Pacific and Montana Ry., Helena, Montana.
MACY, ARTHUR.....433 Lexington ave., New York City.
MAGUIRE, EDWARD.....Captain Corps of Engineers, U. S. A., Fourth floor, Room 20, P. O. Building, Philadelphia, Pa.
MOORE, ROBERT.....Consulting Engineer, Bridge Entrance, St. Louis, Mo.
SAFFORD, EDWARD S.....Arlington, Mass.
SANDERSON, J. GARDNER.....Kingston, N. Y.
STEVENS, JOHN F.....3217 Lindley ave., Minneapolis, Minn.

ASSOCIATES.

DU BARRY, EDMUND L.....Superintendent Eastern Division Norfolk and Western R. R., Crewe, Nottoway Co., Va.
NICOL, THOMAS W.....U. S. Engineer office, Mobile, Ala.

JUNIORS.

MODJESKI, RALPH.....(Care Morison & Corthell), 35 Wall st., New York City.
STEWART, HUNTER.....Deputy City Surveyor, 25 Carondelet st., New Orleans, La.
TAPPAN, ROGER.....158 West Twenty-second st., New York City.

DEATH.

PHINNEY, HENRY W. B.....Elected Member January 7, 1885; died November 22, 1888.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XIV.—December, 1888.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

DECEMBER 5TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

Ballots were canvassed, and the following candidates declared elected. As Members: Alfred Craven, Dobbs Ferry, N. Y.; George Wiley Freeman, Fort Stevens, Ore.; William Edward McClintock, Chelsea, Mass.; Norman James Nichols, Honda, Republic of Colombia; Henry Whitbeck Potter, Mexico, Mex.; Edward Herbert Stone, Simla, India; Samuel C. Weiskopf (elected Junior May 7th, 1884), Pittsburgh, Pa. As Associate: John Cresson Trautwine, Jr., Philadelphia, Pa. As Juniors: Thomas Warren Allen, New York City; Mark Fargusson, Brooklyn, N. Y.; John Moyer Farley, Albany, N. Y.; Charles Francis Wood, New Haven, Conn.

A letter from the Council of the Institution of Civil Engineers, making inquiry as to a probable visit of members of the American Society of Civil Engineers to Europe during the coming year, was read, and, on motion, referred to the Board of Direction.

The Secretary announced the death of Samuel Barrett Cushing, M. Am. Soc. C. E., on December 3d, 1888, and of Henry W. B. Phinney, M. Am. Soc. C. E., on November 22d, 1888.

A paper by Edward Bates Dorsey, M. Am. Soc. C. E., on "English and American Railroads Compared in Operating Expenses," was read by the Secretary and discussed by Messrs. T. C. Clarke, J. P. Davis, J. J. R. Croes, Voorhees, Brendlinger, North, Cooper.

DECEMBER 19TH, 1888.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the chair; John Bogart, Secretary.

A letter from the Society of Arts of London, in reference to proposed European trip, was read by the Secretary.

The Secretary read the results of some experiments on the action of the Teredo on woods preserved in different ways. The subject was discussed by Messrs. Collingwood, Flagg, Cooper, Gosling, Croes, Bogart, and Buck.

John Bogart, M. Am. Soc. C. E., gave a description of Lift Bridges on the canals of the State of New York, and the subject was discussed by Messrs. Flagg, J. P. Davis, Cooper, Croes, Collingwood, Gosling, H. W. Brinckerhoff, Rumble, Buck, and Just.

OF THE BOARD OF DIRECTION.

NOVEMBER 8TH, 1888.—Applications were considered. Financial business transacted.

A communication from Mr. J. E. Watkins, Curator United States National Museum, as to depositing a badge of the American Society of Civil Engineers in the Numismatic Collection of the Museum, was considered.

DECEMBER 6TH, 1888.—Applications were considered. Appropriations made.

A communication from the Council of the Institution of Civil Engineers, in reference to proposed visit to Europe, was considered.

The question of enlargement of the present Society House or the securing of other quarters was considered, and it was resolved to hold a special meeting of the Board on this subject on December 17th, 1888.

DECEMBER 17TH, 1888.—Applications were considered.

A letter from the Society of Arts of London, in reference to proposed visit to Europe, was read. The subject of Society Quarters was considered and committees were appointed to report.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Election.
CRAVEN, ALFRED.....Division Engineer New Croton Aqueduct, Dobbs Ferry, N. Y.....	Dec. 5, 1888

POTTER, HENRY WHITBECK.....Calle San Juan de Letran 4, Apartado de Correo 198, Mexico, Mexico ..... Dec. 5, 1888

JUNIORS.

FARGUSSON, MARK.....257 Jefferson ave., Brooklyn, N. Y..... Dec. 5, 1888

FARLEY, JOHN MOYER .....Fort Plain, N. Y..... Dec. 5, 1888

CHANGES AND CORRECTIONS.

APPLETON, THOMAS.....Secretary Elastic Nut Co., Milwaukee, Wis.

BALDWIN, FRED. H.....101 Commercial st., Greenpoint, N. Y.

BLACK, WILLIAM M.....Captain Corps Engineers U. S. A., P. O. Drawer R, St. Augustine, Fla.

BRODHEAD, CALVIN E.....(Care Lehigh Coal and Iron Co.), 185 East Fourth st., St. Paul, Minn.

CHANUTE, OCTAVE.....Consulting Engineer, 5 Ritchie Place, Chicago, Ill.

COLTON, OREN B.....2009 Wallace st., Philadelphia, Pa.

CONSTABLE, CASIMIR.....41 West Thirty-seventh st., New York City.

CORNELL, GEORGE B.....45 Broadway, New York City.

CRAIG, CHAMBUS M.....Buena Vista, Ga.

GIELOW, HENRY J.....239 Broadway, Room 18, New York City.

LAFON, THOMAS.....(Care Dr. A. W. McAlester), Columbia, Boone Co., Tenn.

LUDLOW, WILLIAM.....Major of Engineers, Bvt. Lt.-Col. U. S. A., Detroit, Mich.

MACLAY, WILLIAM W.....Department of Docks office, foot of Chambers st., North River, New York City.

MORSE, CHARLES J.....2067 Ogden st., Denver, Col.

PARET, MILNOR P.....U. S. Resident Engineer, Fernandina, Fla.

PRENDERGAST, FRANCIS E.....Newton Highlands, Mass.

PRICE, PHILIP M.....Captain Corps of Engineers U. S. A., Montgomery, Ala.

PRINDLE, FRANKLIN C.....Chief Engineer and Superintendent Carolina Oil and Creosote Co., P. O. Box 551, Wilmington, N. C.

ROCKWELL, SAMUEL.....Chief Engineer Eastern Ry., St. Paul, Minn.

SAMPLE, JOHN H.....Chief Engineer Louisville, St. Louis and Texas Ry., 251 Fourth st., Louisville, Ky.

VAN SANT, ROBERT L.....Chief Engineer Indianapolis, Decatur and Western Ry., Indianapolis, Ind.

WILDER, FRANCIS M.....35 Wall st., New York City.

JUNIORS.

BAIER, JULIUS.....2606 N. Market st., St. Louis, Mo.
CABROLL, EUGENE.....The Light, Heat and Water Co., Jackson, Mich.
KASTL, ALEXANDER E.....793 Michigan ave., Detroit, Mich.
LANT, FRANK P.....Copake Iron Works, New York.
SIKES, GEORGE R.....539 Plymouth ave., Buffalo, N. Y.
TENNEY, GEORGE O.....Box 2, New Decatur, Ala.

RESIGNATIONS.

CASSATT, ALEXANDER J..... December 31, 1888
PHILBRICK, PHILETUS H..... December 31, 1888
POLK, GEORGE W..... December 31, 1888
ROBERTS, POULTER B..... December 31, 1888
SEARS, CLINTON B..... December 31, 1888
SWIFT, MCREE..... December 31, 1888

DEATHS.

CUSHING, SAMUEL B.....Elected Member June 1, 1887; died December 3, 1888.
STEWART, DAVID A.....Elected Fellow November 7, 1872; died December 14, 1888.

ADDITIONS TO
LIBRARY AND MUSEUM.

From American Institute of Mining Engineers. Dr. R. W. Raymond, Secretary, New York City:

Coal Production in Utah, 1886. Charles A. Ashburner.
The Construction of Maps in Relief. John H. Harden.
Matting Dry Auriferous Silver Ores. W. L. Austin.
La Plata Del Libano Mines, Department of Tolima, Republic of Colombia, South America. Willard Ide Pierce.
A Method for the Estimation of Maganese in Steel. Frank Julian.
Discussion of Cheever on Two Conditions of Phosphorous in Iron. H. M. Howe.
Photographing the Interior of a Lead Mine. Fred. P. Deucy.
A Glossary of Furnace Terms in English, French and German. Thomas.

From John W. Bacon, Danbury, Conn:

Thirty-fifth Annual Report of the Railroad Commissioners of the State of Connecticut for the year ending September 30th, 1887.

From Robert Bassel, Technical Attache of the Imperial German Legation, Washington, D. C.:

One Set of Maps of the German Waterways.
Drawings and Descriptions of the Construction of Steam Dredges, Mud Boats and Cruising Steamers in Use in Germany and Published by the Department of Public Works.

From Bates & Kimball, Boston, Mass.:

Technology Architectural Review, Vol. I, Nos. I and II.

From Leonard F. Beckwith, New York City:

A Bound Volume of Photographic Views of Portions of the Electrical Subways, showing Construction, etc.
A Copy of the First Report of the Board of Electrical Control; also Second and Third Reports of the Board of Commissioners of Electrical Subways.
American Newspaper Directory. 1876.
American Railroad Manual. 1873.
Patent Office Report, Vol. 3. 1856.
" " Agriculture. 1857.
" " Vol. 2. 1861.
" " " 1. 1863.
" " " 2. 1863.
" " " 1. 1864.
" " " 2. 1864.
" " " 1. 1865.

Patent Office Report, Vol. 2. 1865.
" " " 3. 1865.
" " " 1. 1866.
" " " 2. 1866.
" " " 3. 1866.
" " " 1. 1870.
" " " 1. 1871.
" " " 2. 1871.
Official Gazette of the Patent Office, Vols. 1 and 2. 1872.
List of Patents, January to June. 1869.
" " July to December. 1869.
Index. 1870.
List of Patents, January to June. 1870.
" " July to December. 1870.
" " July to December. 1871.

From Henry P. Bell, Victoria, British Columbia:
Report on an Exploratory Survey for a Line of Railway to Connect the Canadian Pacific Railway with Barkerville, Cariboo District.

From General S. V. Benet, Chief of Ordnance, Washington, D. C.:
Theoretical Investigations Relating to Interior Ballistics. Lieut. D. A. Howard.
The Ordnance Department 52-inch Calipers. Lieut. H. E. Bonep.

From H. Bissell, Salem, Mass.:
Twenty-sixth Annual Report of the Maine Central Railroad Company for the year ending September 30th, 1887.

From R. L. Blakman, Danville, Ky.:
Observations on the Zodiacal Light from April 2d, 1853, to April 22d, 1855, Vol. III. George Jones, Washington. 1856.

From the Board of Electrical Control, New York City:
First Report of the Board of Electrical Control for the City of New York, January 6th, 1888.

From Eugene Bolan, Paris, France:
Progidis Rillieux, Part 1 and Part 2.

From Prof. N. Bodington, Leeds, England:
Yorkshire College Calendar for the Fourteenth Session. 1887–88.

From John Bogart, New York City:
First Annual Report of the Managers of the St. Laureuce State Asylum for the Insane for the year 1887.
Report of the Commission on New Asylum for Insane Criminals for the year ending December 31st, 1887.

From C. R. Boyd, Wytheville, Virgina:
Boyd's Map of Southwest Virginia.

From Bureau of Education, Washington, D. C.:
Report of the Commissioners of Education for the years 1885–86.
The Study of History in American Colleges and Universities. Herbert B. Adams, Washington. 1887.

From Bureau of Navigation, Navy Department, Washington, D. C.:
Pilot Chart of the North Atlantic Ocean for January, February, March and April, 1888.

From Bureau of Statistics, Washington, D. C.:
Annual Report and Statements of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States for the Fiscal Year ending June 30th, 1887.
Reports from the Consuls of the United States, Nos. 86, 87, 88 and 89; November, December, 1887; January and February, 1888.

From Buffalo Merchants' Exchange, William Thurstone, Secretary, Buffalo, N. Y.:
Annual Report of the Buffalo Merchants' Exchange, including Statistics of the Trade and Commerce of Buffalo for the year 1887.

From California Academy of Science, Samuel B. Christy, Secretary, San Francisco, Cal.:
Proceedings, Vol. V, Parts 1 and 2, 1873; Part 3, 1874; Vol. VI, 1875; Vol. II, Part 1, 1876, also Index. Bulletin, No. 1, February, 1884; Bulletin, No. 2, January, 1885; Bulletin, No. 3, February, 1885; Bulletin, Vol. II, November, 1887. Memoirs, Vol. II, No. 1.

From Gen. Thomas Lincoln Casey, Chief of Engineers, Washington, D. C.:
Advertisements, Specifications and Proposals, as follows:
For Improving Ship Channel in Galvelston Bay, Texas.
For Improvement of Wappoo Cut, South Carolina.
For Improving Vicksburg Harbor, Miss.
For Stone for Lock.
For Improving Pocomoke River, Maryland.
For Removing Wreck at Cornfield Shoal, Long Island Sound.
For Improvement of Raritan River, New Jersey.
For Snagboat for Columbia and Williamette Rivers.
For Furnishing a Steam-Launch during the year 1888 for Service at Sandy Bay, Mass.
For Improving Harlem River, New York.
For Removal of Wreck in Delaware Bay.
For Improving Harbor at Oswego, New York.
For Materials for Improvement of Potomac River, D. C.
For Improving Sheepshead Bay, New York.
For Extending the Breakwater at New Haven, Conn.
For Removal of the Wreck of the Schooner "Dorcas and Eliza," in Pasquotauk River, North Carolina.
For Stone for Lock at Beatyville, Kentucky.
For Removal of Wrecks in Mataponi River, Virginia.
For Removal of Wreck from the Delaware River at Philadelphia, Pa.
For Removal of Wreck of the Steamer "Alice Clark."
For Removal of Wreck in Delaware Breakwater Harbor.
For Dredging Harbor at Cheboygan, Mich.
For Repair of U. S. Engineer Steamer "Tourist."
For Removal of Wreck in Chehaw River, South Carolina.
For Improvement of the Cape Fear River, North Carolina, at and below Wilmington.
For Building a Pile Dike at Canarsie Bay, New York.
For Drilling and Blasting at Saint Mary's Falls Canal, Michigan.
For Furnishing White Oak Timber for Lock Gates at Saint Mary's Falls Canal, Mich.
For Construction of Lock-Tender's House.

Annual Report upon the Improvement of certain Rivers and Harbors in Maryland, Virginia and North Carolina.

Reports of the Examination and Survey of Tillamook Bay and Bar, Oregon.

Reports of the Examination and Survey of Salt River, Kentucky.

Report of Survey of the Entrance and Outer Bar at San Diego, California.

Report in Relation to the Estimate for Surveys and Reconnaissances in Military Divisions and Departments.

Report upon the Probabilities of Damage to Improvements and the Necessity for Immediate Work on the Flats above the Long Bridge, in front of Washington, D. C.

Reports of the Examination and Survey of parts of Patuxent River, Maryland.

Report in Regard to the Commerce passing the Saint Mary's Falls Canal.

Reports of the Examinations and Surveys of the Mississippi River between Saint Paul and the Saint Anthony's Falls, and of the Red River of the North, from Moorhead to Fergus Falls.

Report on a Bridge Across the Missouri River.

Report of the Examination and Survey of Bayoduce River, Maine.

Reports Respecting the Purchase of a Dredge for Use in Improvement of Harbors in California.

Reports of Examination and Survey of Rockport and Camden Harbors, Maine.

Reports of the Examinations and Surveys of Kennebec and Penobscot Rivers, Maine.

Reports from the Chief of Engineers in Relation to the Proposed Revetting of Williamette River, Oregon.

Reports of the Examinations and Surveys of Jekyle Creek, Georgia, and part of Mosquito Creek, South Carolina.

Report of the Examination and Survey of Gauley and Meadow Rivers, West Virginia.

Report in Regard to the Muskingum River Improvement, Ohio.

Report on an Estimate from the Secretary of War of Appropriation for a Survey of Anocostia River, District of Columbia.

Report of the Examination and Surveys of the Ohio River, near Evansville, Indiana; Big Hockhocking River, from its Mouth to Coolville, Ohio, and of Louisa Fork of Sandy River, Virginia.

Report of the Examination and Survey of New Bedford Harbor, Taunton River, Massachusetts.

Reports of the Examinations and Surveys of the Harbors of Duxbury, Manchester, Wellfleet and Winthrop, Mass.

The Annual Report of the Mississippi River Commission.

Reports of Preliminary Examinations of Localities Found to be Unworthy of Improvement by the Government.

Reports of the Examinations and Surveys of Obeils (Obeys) River, Tennessee, and Bear Creek, Mississippi.

Reports of the Examination and Survey of Tonawanda Harbor and Niagara River, New York, between Black Rock and Tonawanda.

Report of a Survey of Savannah River, from Cross Tides, above Savannah, to the Bar.

Reports of the Use, Occupancy of, and Injury to, Public Works.

Report on Estimate of Cost of Improving Channel at Entrance of Detroit River.

Report in Relation to the Proposed Acceptance by the United States of a Deed tendered by the City of Duluth for certain Lots in that City for Purposes of Navigation and Commerce.

Report of a Tabulated Statement of Balances on Hand for the Improvement of Rivers and Harbors, November 1st, 1887.

Report Recommending that Provision be made to pay Expenses of Surveys for Jetties at South Pass of the Mississippi River, authorized by the River and Harbor Act of March 3d, 1875.

Report in Reference to the Acquiring by the United States the Title to Land Adjoining a Pier Built for the Improvement of the Harbor, at Port Clinton, Ohio.

Report upon the Preliminary Examination of Spring Creek, New York.

Report from Officers in Charge of River and Harbor District Respecting Interferences with Navigation by Bridges, Causeways and other Structures.

Report of a Board of Engineers, a Draft, and Recommending the Passage, of an Act to Regulate the Construction of Bridges over the Muskingum River, Ohio.

Report in Relation to the Improvements of the Black Warrior, Kentucky, Cumberland, and Allegheny Rivers, and Ludington Harbor.

Report concerning the Improvement of Navigation on Lake Champlain.

Report of the Examination and Survey of San Pedro Bay, California.

Report of the Operations of the Mississippi River Commission from July 1st to November 1st, 1887.

Report in Regard to the Cost of Repairing West Pier in Oswego Harbor, and of the Necessity and Cost of Removing the East Breakwater in the Mouth of the River.

Annual Report of the Joint Commission for the Completion of the Washington Monument.

Reports Relating to the Construction of the Bridge over the Eastern Branch of the Potomac River.

Reports of the Examination and Survey of Kaskaskia River, Illinois, and of the Mississippi River, at Rush Island and Ivy Landing.

Report of Survey of Newport Harbor, California.

Report in Relation to the Proposed Extension of the East Breakwater at Cleveland, Ohio.

Report of Survey of the Outer and Inner Bars at Pensacola Harbor, Florida.

Report of the Board of Engineers Relative to the Construction of Certain Bridges Across the Missouri, Mississippi and Illinois Rivers.

Report upon the Works at Memphis, to Accompany the Report of the Mississippi River Commission from July 1st to November 1st, 1887.

Report with Inclosures Relative to the Alleged Obstruction of the Wabash River at Mount Camel, Ill., by the Construction of a Railway Bridge by the Louisville, Evansville and Saint Louis Railroad Company.

Annual Report of the Chief of Engineers, U. S. Army, Parts I, II and III. 1886.

From Edgar S. Fassett, Albany, N. Y.:
Metallic Street Railway Supply Company's Catalogue.

From Charles Glackmeyer, City Clerk of Montreal, Canada:
Reports on the Corporation Accounts of the City of Montreal and Reports of the Chiefs of Departments for the year 1886.

From B. S. Church, New York City:
Two Reports of the Aqueduct Commission on Researches Concerning the Design and Construction of High Masonry Dams, in View of the Proposed Building of Quaker Bridge Dam. B. S. Church, A. Fteley, New York City, 1887.

From George Earl Church, London:
The Venezuela Central Railway and its Sources of Traffic.

From Engineers' Society of Western Pennsylvania. S. M. Wickersham, Secretary. Pittsburgh, Pa.:
Slide Movement Diagram. J. E. Greiner.
Discussion of the Paper of Mr. Bray on the Welding of Steel Tubes.
The Effect of Temperature upon Structural Iron and Steel. Mr. Ramsey.

From Streehert Claus, Berlin, Prussia:
Membership of the Society of Railroads for Dissemination, Intelligence, Communications on Railroad Construction, and the Transactions of the Society for 1887.

From Jacob M. Clark, New York City:
Annual Reports of the Central Railroad Co. of New Jersey, for the years 1852, 1853, 1855-63, 1865-76, inclusive; also Statement of the Board of Directors to the Stockholders of the Central Railroad Company of New Jersey, September 9th, 1876.

From Prof. George H. Cook, State Geologist of New Jersey, New Brunswick, New Jersey:
Annual Report of the State Geologist of New Jersey for the year 1887.

From L. E. Cooley, Chicago, Illinois:
The Lakes and Gulf Waterway. L. E. Cooley, Chicago, 1888.

From General Cyrus B. Comstock, New York City:
Twelfth Memoirs, Ratio of Meter to Yard. Vol. III.

From Theodore Cooper, New York City:
General Specifications for Iron and Steel Railroad Bridges and Viaducts. New and revised edition, 1888. Theodore Cooper, New York, 1888.

From William A. Crafts, Boston, Massachusetts:
Nineteenth Annual Report of the Board of Railroad Commissioners, January, 1888.

From Hon. Ernest H. Crosby, Albany, N. Y.:
First Report of the Board of Electrical Control for the City of New York, for the year 1887.

From Edward Bates Dorsey, New York City:
The Truth About the Navy and Its Coaling Stations.
Handbook of the 1 inch Nordenfelt Gun, 1883.
Handbook of the Hotchkiss Rapid-firing Gun; 6-pounder, 3-pounder and 1-pounder Guard Boat Gun.
Documents to be sent to the Railway Department, Board of Trade, previously to the Second Notice of the Intention to Open a Railway being given.
Provisional Specifications on Improvements in Navigable Vessels and their Steering Apparatus. John I. Thornycroft, London, 1885.
Torpedo Boats. John Donaldson.
On Torpedo Boats and Light Yachts for High-speed Navigation. John Isaac Thornycroft. (With an Abstract of the Discussion upon the paper.)
The Further Development of the Thornycroft Torpedo Vessels. John Donaldson.
The Use of Torpedoes in War, Commander E. P. Gallucy.
Report on the Increase of the Naval Establishment.
Report on the Relative Steering Efficiencies of the Rudder Alone and of the Kunstadter System of Combined Rudder and Swiveling Screw, as Developed by the Experiments made with the United States Screw Steamer "Nina," to which the two Systems were applied.

From John J. Granville, East Saginaw, Michigan:
Third Annual Report of the Board of Public Works of East Saginaw, Michigan, for the Fiscal Year ending January 1st, 1888.

From G. S. Greene, Jr., New York City:
One Copy, Annual Report and Minutes of the Department of Docks, April 30th, 1887.
Annual Report Department of Docks, April 30th, 1887. (Several copies.)

From General A. W. Greely, Chief Signal Officer of the Army, Washington, D. C.:
United States Signal Service Monthly Weather Review for October, November, December, 1887, and January, 1888.

From Harbor and Land Commissioners, Boston, Massachusetts:
Annual Report of the Harbor and Land Commissioners, for the year 1887.

From John H. Harden, Phœnixville, Penn.:
The Construction of Maps in Relief. John H. Harden and Edward B. Harden, 1887.

From William J. Haskins, New York City:
Map showing Topographical Survey of Land to be taken for Pelham Bay Park.

From Prof. Lewis M. Haupt, Philadelphia, Pa.:
The Physical Phenomena of Harbor Entrances; their Causes and Remedies; Defects of Present Methods of Improvement. Lewis M. Haupt, Philadelphia, 1888.

From Gen. W. B. Hazen, Chief Signal Officer U. S A., Washington, D. C.:
Annual Report of the Chief Signal Officer of the Army to the Secretary of War for the year 1886.

From Charles Hermany, Louisville, Kentucky:
Annual Reports of the Louisville Water Company for the years ending December 31st, 1867 to 1886.

From John R. Hudson, Pomona, California:

Tables for Calculating the Cubic Contents of Excavations and Embankments. Vol. II. John R. Hudson, New York, 1887.

From William A. Ingham, Secretary Board of Commissioners, Second Geological Survey of Pennsylvania:

Annual Report of the Geological Survey of Pennsylvania for 1886, Part 2.

From Institution of Civil Engineers, James Forest, Secretary, London:

Accidents in Mines. Sir Frederick Augustus Ael, (with an Abstract of the Discussion upon the Paper).

The Sulina Mouth of the Danube. Charles Henry Leopold Kuhl.

Note on the Government Testing Works at Malines, Belgium. E. J. Roussel.

The Locomotive and Rolling Stock of the Bengal and Northwestern Railway Company, Limited, India. James Rhind.

Notes on the Engineering Laboratories of the Massachusetts Institute of Technology. Prof. Gaetano Lanza.

Hydraulic Appliances at the Forth Bridge Works. Ernest William Moir.

The Bessbrook and Neury Tramway. Edward Hopkinson (with an Abstract of the Discussion upon the Paper).

A Simple Method of Ascertaining the Discharge of Rivers, and Prediction of the Height of the Elbe in Bohemia and Saxony. Profs. A. R. Harlacher and H. Richter.

Proceedings, Vol. XCL, 1887-88, Part 1.

List of Members, January 2d, 1888.

Tacheometry on Rapid Surveying. Bennett Hooper Brough.

Southampton Sewerage Classifications and House Refuse Disposal Works. William Benjamin George Bennett.

Propelling Machinery of Modern War Ships. Sidney Herbert Wells.

Sizing Paper with Rosin. James William Wyatt.

Abstracts of Papers in Foreign Transactions and Periodicals.

From William Jackson, Boston, Massachusetts:

Twelfth Annual Report of the Boston Water Board for the year ending December 31st, 1887.

From J. S. Jeans, Secretary Iron and Steel Institute, London:

The Journal of the Iron and Steel Institute, November 11th, 1887.

From Alfred Kimber, New York City:

Plans and Sections of Water Works Extension and Improvement of Streets in the Corporation of Manchester, England, November, 1862.

From S. S. Leach, Secretary Mississippi River Commission, St. Louis, Mo.:

One (8 sheets) Map of the Alluvial Valley of the Mississippi River.

From Manchester Ship Canal Company, A. H. Whitworth, Secretary, Manchester, England:

Report of the Committee Found to Consider the Project of the Manchester Ship Canal, to the Board of Directors of the Canal Company.

Why is it Wanted and Why it Will Pay, with Observations in Reply to Recent Objections, including Appendix Relating to the Bridgewater Navigation Company.

Payment of Interest on Capital during Construction of Works.

The Prospects of Manchester as a Port.

Proposed Opposition of the Mersey Dock Board to the Manchester Ship Canal Bill. 1885.

How the Railway Companies are Crippling British Industry and Destroying the Canals, with Suggestions for Reforming the Whole System of Railway Charges, and Securing the Waterways Permanently for the Nation.

On the Use of Steam for Canal Boat Propulsion.

On Inland Transport.

The London Daily and Periodical Press on the Question of the Manchester Ship Canal.

Facts and Figures in Favor of the Proposed Manchester Ship Canal.

Description of the Project now Before Parliament.

Reply of Mr. Pember, Q. C., on Behalf of the Promoters of the Bill Before the Select Committee of the House of Lords, 20th, 21st and 22d May, 1884.

List of Members of the Provisional Committee and a Number of the Supporters to the Tees and Tyne, with a Verbatim Report of the Great Public Meeting held in the Free Trades Hall, Manchester, on Wednesday, October 31st, 1883.

Plan and Description of the Large Model of the Ship Canal on Review at the Royal Jubilee Exhibition, Manchester, 1887.

General Plan of Canal and District.

From Massachusetts Institute of Technology, Boston, Mass.:

Technology Quarterly, Vol. I, No. 1 and 2.

From Gratz Mordecai, Philadelphia, Pa.:

Blue Print of Schedule of Railroad Freight Expenses of Operation Chargeable to Car Lots.

Plan of Improvement of River Front, New York, proposed by Committee of Engineers.

Schedule of Street Districts.

General Analysis of the Classification and Movement of Freight at the Port of New York (2 Plans).

Approximate Estimate of Population and Consumption in New York City, South of Harlem.

Bay and Harbor of New York.

Plan of Property of the N. Y., L. E. and W. R. R. Co., Weehawken, N. J.

Title and Assessment Map of that part of Jersey City which constitute the City of Bergen prior to Consolidation in 1870, from the Records and Verified by Surveys, 1882 (3 sheets).

Map of New York City.

Tracing of Portions of Jersey City, Hoboken, etc.

Map of Long Island City, Queens County, N. Y. (2 sheets).

Tracing of Approximate Estimate of Population and Consumption in New York City, South of Harlem, 86th Street, in the year 1885.

Tracing of New York City from 86th Street, North, not complete.

Tracing of New York City.

Map of the City of Brooklyn, N. Y.

Tracing showing Brooklyn Shore.

From Robert Moore, St. Louis, Missouri:

Present Aspect of the Problem of American Inter-Oceanic Ship Transfer.

From John Moore, Surgeon-General U. S. Army, Washington, D. C.:

Index Catalogue of the Library of the Surgeon-General's Office, U. S. Army, Vol. VIII.

From New York Meteorological Observatory, Department of Public Parks, Dr. Daniel Draper, Director:

Abstracts of Registers from Self-recording Instruments, November and December, 1887.

From Captain Carl F. Palfrey, Washington, D. C.:

Annual Report upon the Improvement of Harbors on Lake Ontario, east of Oak Orchard, New York.

From William F. Phelps, Secretary Chamber of Commerce, Duluth, Minnesota:

Official Report of the Proceedings of the Waterways Convention held at Sault St. Marie, Michigan, July 20, 1887.

From Arthur Pou, Talbotton, Georgia:

Annual Reports of the Wrightsville and Tennville R. R. Co., for the years 1884–85–86 and 87, and First Annual Report of the Dublin and Wrightsville R. R. Co., for the year 1885.

From Frederick J. H. Rickon, Little Rock, Arkansas:

Transactions of the Arkansas Society of Engineers, Architects and Surveyors, Vol. I, November, 1887.

From C. P. Sandberg, Westminster, London:

Swedish Railways Technically and Commercially; also Railway Map of Sweden.

From Collingwood Schreiber, Ottawa, Canada:

Government Railways, Ottawa, Canada.

Report of the Royal Commission on Railways, with Appendices, 1888.

Annual Report of the Minister of Railways and Canals for the past Fiscal Year from 1st July, 1886, to 30th June, 1887.

From Richard W. Sherman, Utica, N.Y.:

Annual Report of the City Surveyor for the year ending February 20th, 1888.

From the State Board of Health, Boston, Mass.:

Report of the State Board of Health of Massachusetts on Water Supply and Sewerage under the provisions of Chapter 274 of the Act of 1886, January, 1888.

From Waterman Stone, Providence, R. I.:

Annual Report of the Commissioner of Dams and Reservoirs to his Excellency John W. Davis, Governor, January 1st, 1888.

From Robert Surtees, Ottawa, Canada:

Annual Report of the Water Works Committee of Ottawa, Canada, for the year ending 31st October, 1887.

From J. Nelson Tubbs, Rochester, N.Y.:

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